

14-03 WO.sequence listing.txt
SEQUENCE LISTING

<110> University of Georgia Research Foundation, Inc
Mohnen, Debra
Hahn, Michael G.
Kolli, Venkata S.K.
Doong, Ron L.
Sterling, Jason D.

<120> Galacturonosyltransferases, nucleic acids encoding same, and uses therefor

<130> 14-03 WO

<140> Not assigned

<141> 2004-02-05

<150> US 60/445,539

<151> 2003-02-06

<160> 50

<170> PatentIn version 3.2

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<212> DNA
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 35 40 45

Ser Asn Asp Tyr Ser Ile Val Ser Val Lys Gln Asn Leu Asp Trp Arg
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Glu Arg Leu Ala Met Gln Ser Val Arg Ser Leu Phe Ser Lys Glu Ile
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Asp Ser Phe Lys Lys Asn Asn Leu Ser Ala Ser Trp Arg Gly Thr Gly
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Val Asp Pro Ser Phe Arg His Ser Glu Asn Pro Ala Thr Pro Asp Val
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Lys Ser Asn Asn Leu Asn Glu Lys Arg Asp Ser Ile Ser Lys Asp Ser
130 135 140

Ile His Gln Lys Val Glu Thr Pro Thr Lys Ile His Arg Arg Gln Leu
145 150 155 160

Arg Glu Lys Arg Arg Glu Met Arg Ala Asn Glu Leu Val Gln His Asn
165 170 175

Asp Asp Thr Ile Leu Lys Leu Glu Asn Ala Ala Ile Glu Arg Ser Lys
180 185 190

Ser Val Asp Ser Ala Val Leu Gly Lys Tyr Ser Ile Trp Arg Arg Glu
195 200 205

Asn Glu Asn Asp Asn Ser Asp Ser Asn Ile Arg Leu Met Arg Asp Gln
210 215 220

Val Ile Met Ala Arg Val Tyr Ser Gly Ile Ala Lys Leu Lys Asn Lys
225 230 235 240

Asn Asp Leu Leu Gln Glu Leu Gln Ala Arg Leu Lys Asp Ser Gln Arg
245 250 255

Val Leu Gly Glu Ala Thr Ser Asp Ala Asp Leu Pro Arg Ser Ala His
260 265 270

Glu Lys Leu Arg Ala Met Gly Gln Val Leu Ala Lys Ala Lys Met Gln
275 280 285

Leu Tyr Asp Cys Lys Leu Val Thr Gly Lys Leu Arg Ala Met Leu Gln
290 295 300

Thr Ala Asp Glu Gln Val Arg Ser Leu Lys Lys Gln Ser Thr Phe Leu
305 310 315 320

Ala Gln Leu Ala Ala Lys Thr Ile Pro Asn Pro Ile His Cys Leu Ser
325 330 335

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Met Arg Leu Thr Ile Asp Tyr Tyr 340 345 Leu Leu Ser Pro Glu Lys Arg Lys 350

Phe Pro Arg Ser Glu Asn Leu Glu Asn Pro Asn Leu Tyr His Tyr Ala 355 360 365

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Ile Met Asn Ala Lys Asp Pro Ser Lys His Val Phe His Leu Val Thr 385 390 395 400

Asp Lys Leu Asn Phe Gly Ala Met Asn Met Trp Phe Leu Leu Asn Pro 405 410 415

Pro Gly Lys Ala Thr Ile His Val Glu Asn Val Asp Glu Phe Lys Trp 420 425 430

Leu Asn Ser Ser Tyr Cys Pro Val Leu Arg Gln Leu Glu Ser Ala Ala 435 440 445

Met Arg Glu Tyr Tyr Phe Lys Ala Asp His Pro Thr Ser Gly Ser Ser 450 455 460

Asn Leu Lys Tyr Arg Asn Pro Lys Tyr Leu Ser Met Leu Asn His Leu 465 470 475 480

Arg Phe Tyr Leu Pro Glu Val Tyr Pro Lys Leu Asn Lys Ile Leu Phe 485 490 495

Leu Asp Asp Asp Ile Ile Val Gln Lys Asp Leu Thr Pro Leu Trp Glu 500 505 510

Val Asn Leu Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Gly Glu 515 520 525

Ser Phe His Arg Phe Asp Lys Tyr Leu Asn Phe Ser Asn Pro His Ile 530 535 540

Ala Arg Asn Phe Asn Pro Asn Ala Cys Gly Trp Ala Tyr Gly Met Asn 545 550 555 560

Met Phe Asp Leu Lys Glu Trp Lys Lys Arg Asp Ile Thr Gly Ile Tyr 565 570 575

His Lys Trp Gln Asn Met Asn Glu Asn Arg Thr Leu Trp Lys Leu Gly 580 585 590

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Thr Leu Pro Pro Gly Leu Ile Thr Phe Tyr Gly Leu Thr His Pro Leu
595 600 605

Asn Lys Ala Trp His Val Leu Gly Leu Gly Tyr Asn Pro Ser Ile Asp
610 615 620

Lys Lys Asp Ile Glu Asn Ala Ala Val Val His Tyr Asn Gly Asn Met
625 630 635 640

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<213> *Arabidopsis thaliana*

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35 40 45

Ser Pro Gly Phe Val Thr Val Gln Pro Ala Ser Ser Phe Glu Ser Phe
50 55 60

Thr Arg Ile Asn Ala Thr Lys His Thr Gln Arg Asp Val Ser Glu Arg
65 70 75 80

Val Asp Glu Val Leu Gln Lys Ile Asn Pro Val Leu Pro Lys Lys Ser
85 90 95

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Asp Ile Asn Val Gly Ser Arg Asp Val Asn Ala Thr Ser Gly Thr Asp
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Ser Lys Lys Arg Gly Leu Pro Val Ser Pro Thr Val Val Ala Asn Pro
115 120 125

Ser Pro Ala Asn Lys Thr Lys Ser Glu Ala Ser Tyr Thr Gly Val Gln
130 135 140

Arg Lys Ile Val Ser Gly Asp Glu Thr Trp Arg Thr Cys Glu Val Lys
145 150 155 160

Tyr Gly Ser Tyr Cys Leu Trp Arg Glu Glu Asn Lys Glu Pro Met Lys
165 170 175

Asp Ala Lys Val Lys Gln Met Lys Asp Gln Leu Phe Val Ala Arg Ala
180 185 190

Tyr Tyr Pro Ser Ile Ala Lys Met Pro Ser Gln Ser Lys Leu Thr Arg
195 200 205

Asp Met Lys Gln Asn Ile Gln Glu Phe Glu Arg Ile Leu Ser Glu Ser
210 215 220

Ser Gln Asp Ala Asp Leu Pro Pro Gln Val Asp Lys Lys Leu Gln Lys
225 230 235 240

Met Glu Ala Val Ile Ala Lys Ala Lys Ser Phe Pro Val Asp Cys Asn
245 250 255

Asn Val Asp Lys Lys Leu Arg Gln Ile Leu Asp Leu Thr Glu Asp Glu
260 265 270

Ala Ser Phe His Met Lys Gln Ser Val Phe Leu Tyr Gln Leu Ala Val
275 280 285

Gln Thr Met Pro Lys Ser Leu His Cys Leu Ser Met Arg Leu Thr Val
290 295 300

Glu His Phe Lys Ser Asp Ser Leu Glu Asp Pro Ile Ser Glu Lys Phe
305 310 315 320

Ser Asp Pro Ser Leu Leu His Phe Val Ile Ile Ser Asp Asn Ile Leu
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Ala Ser Ser Val Val Ile Asn Ser Thr Val Val His Ala Arg Asp Ser
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Lys Asn Phe Val Phe His Val Leu Thr Asp Glu Gln Asn Tyr Phe Ala
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Met Lys Gln Trp Phe Ile Arg Asn Pro Cys Lys Gln Ser Thr Val Gln
370 375 380

Val Leu Asn Ile Glu Lys Leu Glu Leu Asp Asp Ser Asp Met Lys Leu
385 390 395 400

Ser Leu Ser Ala Glu Phe Arg Val Ser Phe Pro Ser Gly Asp Leu Leu
405 410 415

Ala Ser Gln Gln Asn Arg Thr His Tyr Leu Ser Leu Phe Ser Gln Ser
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His Tyr Leu Leu Pro Lys Leu Phe Asp Lys Leu Glu Lys Val Val Ile
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Arg Leu Gly Gln Leu Arg Ser Leu Lys Arg Gly Asn Phe Asp Thr Asn
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Ala Cys Leu Trp Met Ser Gly Leu Asn Val Val Asp Leu Ala Arg Trp
500 505 510

Arg Ala Leu Gly Val Ser Glu Thr Tyr Gln Lys Tyr Tyr Lys Glu Met
515 520 525

Ser Ser Gly Asp Glu Ser Ser Glu Ala Ile Ala Leu Gln Ala Ser Leu
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Leu Thr Phe Gln Asp Gln Val Tyr Ala Leu Asp Asp Lys Trp Ala Leu
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Ser Gly Leu Gly Tyr Asp Tyr Tyr Ile Asn Ala Gln Ala Ile Lys Asn
565 570 575

Ala Ala Ile Leu His Tyr Asn Gly Asn Met Lys Pro Trp Leu Glu Leu
580 585 590

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<213> *Arabidopsis thaliana*

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35 40 45

Phe Asn Ser Asp Glu Asn Arg Leu Asn Leu Leu Pro Arg Glu Ser Pro
50 55 60

Ala Val Leu Arg Gly Gly Leu Val Gly Ala Val Tyr Ser Asp Lys Asn
65 70 75 80

Ser Arg Arg Leu Asp Gln Leu Ser Ala Arg Val Leu Ser Ala Thr Asp
85 90 95

Asp Asp Thr His Ser His Thr Asp Ile Ser Ile Lys Gln Val Thr His
100 105 110

Asp Ala Ala Ser Asp Ser His Ile Asn Arg Glu Asn Met His Val Gln
115 120 125

Leu Thr Gln Gln Thr Ser Glu Lys Val Asp Glu Gln Pro Glu Pro Asn
130 135 140

Ala Phe Gly Ala Lys Lys Asp Thr Gly Asn Val Leu Met Pro Asp Ala
145 150 155 160

Gln Val Arg His Leu Lys Asp Gln Leu Ile Arg Ala Lys Val Tyr Leu
165 170 175

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Ser Leu Pro Ser Ala Lys Ala Asn Ala His Phe Val Arg Glu Leu Arg
180 185 190

Leu Arg Ile Lys Glu Val Gln Arg Ala Leu Ala Asp Ala Ser Lys Asp
195 200 205

Ser Asp Leu Pro Lys Thr Ala Ile Glu Lys Leu Lys Ala Met Glu Gln
210 215 220

Thr Leu Ala Lys Gly Lys Gln Ile Gln Asp Asp Cys Ser Thr Val Val
225 230 235 240

Lys Lys Leu Arg Ala Met Leu His Ser Ala Asp Glu Gln Leu Arg Val
245 250 255

His Lys Lys Gln Thr Met Phe Leu Thr Gln Leu Thr Ala Lys Thr Ile
260 265 270

Pro Lys Gly Leu His Cys Leu Pro Leu Arg Leu Thr Thr Asp Tyr Tyr
275 280 285

Ala Leu Asn Ser Ser Glu Gln Gln Phe Pro Asn Gln Glu Lys Leu Glu
290 295 300

Asp Thr Gln Leu Tyr His Tyr Ala Leu Phe Ser Asp Asn Val Leu Ala
305 310 315 320

Thr Ser Val Val Val Asn Ser Thr Ile Thr Asn Ala Lys His Pro Leu
325 330 335

Lys His Val Phe His Ile Val Thr Asp Arg Leu Asn Tyr Ala Ala Met
340 345 350

Arg Met Trp Phe Leu Asp Asn Pro Pro Gly Lys Ala Thr Ile Gln Val
355 360 365

Gln Asn Val Glu Glu Phe Thr Trp Leu Asn Ser Ser Tyr Ser Pro Val
370 375 380

Leu Lys Gln Leu Ser Ser Arg Ser Met Ile Asp Tyr Tyr Phe Arg Ala
385 390 395 400

His His Thr Asn Ser Asp Thr Asn Leu Lys Phe Arg Asn Pro Lys Tyr
405 410 415

Leu Ser Ile Leu Asn His Leu Arg Phe Tyr Leu Pro Glu Ile Phe Pro
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14-03 WO.sequence listing.txt

Lys Leu Ser Lys Val Leu Phe Leu Asp Asp Asp Ile Val Val Gln Lys
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Asp Leu Ser Gly Leu Trp Ser Val Asp Leu Lys Gly Asn Val Asn Gly
 450 455 460

Ala Val Glu Thr Cys Gly Glu Ser Phe His Arg Phe Asp Arg Tyr Leu
 465 470 475 480

Asn Phe Ser Asn Pro Leu Ile Ser Lys Asn Phe Asp Pro Arg Ala Cys
 485 490 495

Gly Trp Ala Tyr Gly Met Asn Val Phe Asp Leu Asp Glu Trp Lys Arg
 500 505 510

Gln Asn Ile Thr Glu Val Tyr His Arg Trp Gln Asp Leu Asn Gln Asp
 515 520 525

Arg Glu Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Ile Thr Phe
 530 535 540

Trp Arg Arg Thr Tyr Pro Leu Asp Arg Lys Trp His Ile Leu Gly Leu
 545 550 555 560

Gly Tyr Asn Pro Ser Val Asn Gln Arg Asp Ile Glu Arg Ala Ala Val
 565 570 575

Ile His Tyr Asn Gly Asn Leu Lys Pro Trp Leu Glu Ile Gly Ile Pro
 580 585 590

Arg Tyr Arg Gly Phe Trp Ser Lys His Val Asp Tyr Glu His Val Tyr
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Leu Arg Glu Cys Asn Ile Asn Pro
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14-03 WO.sequence listing.txt

Ser Ile Ser Val Phe Ala Pro Leu Ile Phe Val Ser Asn Arg Leu Lys
20 25 30

Ser Ile Thr Pro Val Gly Arg Arg Glu Phe Ile Glu Glu Leu Ser Lys
35 40 45

Ile Arg Phe Thr Thr Asn Asp Leu Arg Leu Ser Ala Ile Glu His Glu
50 55 60

Asp Gly Glu Gly Leu Lys Gly Pro Arg Leu Ile Leu Phe Lys Asp Gly
65 70 75 80

Glu Phe Asn Ser Ser Ala Glu Ser Asp Gly Gly Asn Thr Tyr Lys Asn
85 90 95

Arg Glu Glu Gln Val Ile Val Ser Gln Lys Met Thr Val Ser Ser Asp
100 105 110

Glu Lys Gly Gln Ile Leu Pro Thr Val Asn Gln Leu Ala Asn Lys Thr
115 120 125

Asp Phe Lys Pro Pro Leu Ser Lys Gly Glu Lys Asn Thr Arg Val Gln
130 135 140

Pro Asp Arg Ala Thr Asp Val Lys Thr Lys Glu Ile Arg Asp Lys Ile
145 150 155 160

Ile Gln Ala Lys Ala Tyr Leu Asn Phe Ala Pro Pro Gly Ser Asn Ser
165 170 175

Gln Val Val Lys Glu Leu Arg Gly Arg Leu Lys Glu Leu Glu Arg Ser
180 185 190

Val Gly Asp Ala Thr Lys Asp Lys Asp Leu Ser Lys Gly Ala Leu Arg
195 200 205

Arg Val Lys Pro Met Glu Asn Val Leu Tyr Lys Ala Ser Arg Val Phe
210 215 220

Asn Asn Cys Pro Ala Ile Ala Thr Lys Leu Arg Ala Met Asn Tyr Asn
225 230 235 240

Thr Glu Glu Gln Val Gln Ala Gln Lys Asn Gln Ala Ala Tyr Leu Met
245 250 255

Gln Leu Ala Ala Arg Thr Thr Pro Lys Gly Leu His Cys Leu Ser Met
260 265 270

14-03 WO.sequence listing.txt

Arg Leu Thr Ser Glu Tyr Phe Ser Leu Asp Pro Glu Lys Arg Gln Met
275 280 285

Pro Asn Gln Gln Asn Tyr Phe Asp Ala Asn Phe Asn His Tyr Val Val
290 295 300

Phe Ser Asp Asn Val Leu Ala Ser Ser Val Val Val Asn Ser Thr Ile
305 310 315 320

Ser Ser Ser Lys Glu Pro Glu Arg Ile Val Phe His Val Val Thr Asp
325 330 335

Ser Leu Asn Tyr Pro Ala Ile Ser Met Trp Phe Leu Leu Asn Ile Gln
340 345 350

Ser Lys Ala Thr Ile Gln Ile Leu Asn Ile Asp Asp Met Asp Val Leu
355 360 365

Pro Arg Asp Tyr Asp Gln Leu Leu Met Lys Gln Asn Ser Asn Asp Pro
370 375 380

Arg Phe Ile Ser Thr Leu Asn His Ala Arg Phe Tyr Leu Pro Asp Ile
385 390 395 400

Phe Pro Gly Leu Asn Lys Met Val Leu Leu Asp His Asp Val Val Val
405 410 415

Gln Arg Asp Leu Ser Arg Leu Trp Ser Ile Asp Met Lys Gly Lys Val
420 425 430

Val Gly Ala Val Glu Thr Cys Leu Glu Gly Glu Ser Ser Phe Arg Ser
435 440 445

Met Ser Thr Phe Ile Asn Phe Ser Asp Thr Trp Val Ala Gly Lys Phe
450 455 460

Ser Pro Arg Ala Cys Thr Trp Ala Phe Gly Met Asn Leu Ile Asp Leu
465 470 475 480

Glu Glu Trp Arg Ile Arg Lys Leu Thr Ser Thr Tyr Ile Lys Tyr Phe
485 490 495

Asn Leu Gly Thr Lys Arg Pro Leu Trp Lys Ala Gly Ser Leu Pro Ile
500 505 510

Gly Trp Leu Thr Phe Tyr Arg Gln Thr Leu Ala Leu Asp Lys Arg Trp
Page 15

14-03 WO.sequence listing.txt

515

520

525

His Val Met Gly Leu Gly Arg Glu Ser Gly Val Lys Ala Val Asp Ile
 530 535 540

Glu Gln Ala Ala Val Ile His Tyr Asp Gly Val Met Lys Pro Trp Leu
 545 550 555 560

Asp Ile Gly Lys Glu Asn Tyr Lys Arg Tyr Trp Asn Ile His Val Pro
 565 570 575

Tyr His His Thr Tyr Leu Gln Gln Cys Asn Leu Gln Ala
 580 585

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<211> 1614

<212> DNA

<213> *Arabidopsis thaliana*

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gaacagacaa	gtcaagatac	gatTCcgag	ccaaaagtga	ggaacccaaa	gtacttgtca	1020
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14-03 WO.sequence listing.txt

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gctttggta tgaacgtttt	tgatctgatc gcttggagga	atgcaaacgt gactgctcg	1320
taccattact ggcaagatca	gaacagagaa cgaacgcttt	ggaaactcgg gacactccct	1380
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 <212> PRT
 <213> *Arabidopsis thaliana*

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 35 40 45

Leu Leu Leu Glu Arg Asp Thr Arg Thr Glu Met Val Ser Pro Pro His
 50 55 60

Leu Asn Phe Thr Glu Glu Val Thr Ser Ala Ser Ser Phe Ser Arg Gln
 65 70 75 80

Leu Ala Glu Gln Met Thr Leu Ala Lys Ala Tyr Val Phe Ile Ala Lys
 85 90 95

Glu His Asn Asn Leu His Leu Ala Trp Glu Leu Ser Ser Lys Ile Arg
 100 105 110

Ser Cys Gln Leu Leu Leu Ser Lys Ala Ala Met Arg Gly Gln Pro Ile
 115 120 125

Ser Phe Asp Glu Ala Lys Pro Ile Ile Thr Gly Leu Ser Ala Leu Ile
 130 135 140

Tyr Lys Ala Gln Asp Ala His Tyr Asp Ile Ala Thr Thr Met Met Thr
 145 150 155 160

14-03 WO.sequence listing.txt

Met Lys Ser His Ile Gln Ala Leu Glu Glu Arg Ala Asn Ala Ala Thr
165 170 175

Val Gln Thr Thr Ile Phe Gly Gln Leu Val Ala Glu Ala Leu Pro Lys
180 185 190

Ser Leu His Cys Leu Thr Ile Lys Leu Thr Ser Asp Trp Val Thr Glu
195 200 205

Pro Ser Arg His Glu Leu Ala Asp Glu Asn Arg Asn Ser Pro Arg Leu
210 215 220

Val Asp Asn Asn Leu Tyr His Phe Cys Ile Phe Ser Asp Asn Val Ile
225 230 235 240

Ala Thr Ser Val Val Val Asn Ser Thr Val Ser Asn Ala Asp His Pro
245 250 255

Lys Gln Leu Val Phe His Ile Val Thr Asn Arg Val Ser Tyr Lys Ala
260 265 270

Met Gln Ala Trp Phe Leu Ser Asn Asp Phe Lys Gly Ser Ala Ile Glu
275 280 285

Ile Arg Ser Val Glu Glu Phe Ser Trp Leu Asn Ala Ser Tyr Ser Pro
290 295 300

Val Val Lys Gln Leu Leu Asp Thr Asp Ala Arg Ala Tyr Tyr Phe Gly
305 310 315 320

Glu Gln Thr Ser Gln Asp Thr Ile Ser Glu Pro Lys Val Arg Asn Pro
325 330 335

Lys Tyr Leu Ser Leu Leu Asn His Leu Arg Phe Tyr Ile Pro Glu Ile
340 345 350

Tyr Pro Gln Leu Glu Lys Ile Val Phe Leu Asp Asp Asp Val Val Val
355 360 365

Gln Lys Asp Leu Thr Pro Leu Phe Ser Leu Asp Leu His Gly Asn Val
370 375 380

Asn Gly Ala Val Glu Thr Cys Leu Glu Ala Phe His Arg Tyr Tyr Lys
385 390 395 400

Tyr Leu Asn Phe Ser Asn Pro Leu Ile Ser Ser Lys Phe Asp Pro Gln
405 410 415

14-03 WO.sequence listing.txt

Ala Cys Gly Trp Ala Phe Gly Met Asn Val Phe Asp Leu Ile Ala Trp
 420 425 430

Arg Asn Ala Asn Val Thr Ala Arg Tyr His Tyr Trp Gln Asp Gln Asn
 435 440 445

Arg Glu Arg Thr Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Leu
 450 455 460

Ser Phe Tyr Gly Leu Thr Glu Pro Leu Asp Arg Arg Trp His Val Leu
 465 470 475 480

Gly Leu Gly Tyr Asp Val Asn Ile Asp Asn Arg Leu Ile Glu Thr Ala
 485 490 495

Ala Val Ile His Tyr Asn Gly Asn Met Lys Pro Trp Leu Lys Leu Ala
 500 505 510

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 515 520 525

Pro Tyr Leu Gln Asp Cys Val Thr Ala
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 <213> *Arabidopsis thaliana*

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14-03 WO.sequence listing.txt

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aatgggaact	taaagccatg	gttgaagatc	ggatagaga	agtacaaacc	tttgtggag	1560
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<211> 536

<212> PRT

<213> *Arabidopsis thaliana*

<400> 12

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			20				25				30				

Phe	Phe	Leu	Ile	Leu	Ser	Lys	Ala	Gly	His	Ile	Glu	Pro	Arg	Pro	Ser
35					40					45					

Ile	Pro	Lys	Arg	Arg	Tyr	Arg	Asn	Asp	Lys	Phe	Val	Glu	Gly	Met	Asn
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Met	Thr	Glu	Glu	Met	Leu	Ser	Pro	Thr	Ser	Val	Ala	Arg	Gln	Val	Asn
65				70				75					80		

Asp	Gln	Ile	Ala	Leu	Ala	Lys	Ala	Phe	Val	Val	Ile	Ala	Lys	Glu	Ser
85						90							95		

14-03 WO.sequence listing.txt

Lys Asn Leu Gln Phe Ala Trp Asp Leu Ser Ala Gln Ile Arg Asn Ser
100 105 110

Gln Leu Leu Leu Ser Ser Ala Ala Thr Arg Arg Ser Pro Leu Thr Val
115 120 125

Leu Glu Ser Glu Ser Thr Ile Arg Asp Met Ala Val Leu Leu Tyr Gln
130 135 140

Ala Gln Gln Leu His Tyr Asp Ser Ala Thr Met Ile Met Arg Leu Lys
145 150 155 160

Ala Ser Ile Gln Ala Leu Glu Glu Gln Met Ser Ser Val Ser Glu Lys
165 170 175

Ser Ser Lys Tyr Gly Gln Ile Ala Ala Glu Glu Val Pro Lys Ser Leu
180 185 190

Tyr Cys Leu Gly Val Arg Leu Thr Thr Glu Trp Phe Gln Asn Leu Asp
195 200 205

Leu Gln Arg Thr Leu Lys Glu Arg Ser Arg Val Asp Ser Lys Leu Thr
210 215 220

Asp Asn Ser Leu Tyr His Phe Cys Val Phe Ser Asp Asn Ile Ile Ala
225 230 235 240

Thr Ser Val Val Val Asn Ser Thr Ala Leu Asn Ser Lys Ala Pro Glu
245 250 255

Lys Val Val Phe His Leu Val Thr Asn Glu Ile Asn Tyr Ala Ala Met
260 265 270

Lys Ala Trp Phe Ala Ile Asn Met Asp Asn Leu Arg Gly Val Thr Val
275 280 285

Glu Val Gln Lys Phe Glu Asp Phe Ser Trp Leu Asn Ala Ser Tyr Val
290 295 300

Pro Val Leu Lys Gln Leu Gln Asp Ser Asp Thr Gln Ser Tyr Tyr Phe
305 310 315 320

Ser Gly His Asn Asp Asp Gly Arg Thr Pro Ile Lys Phe Arg Asn Pro
325 330 335

Lys Tyr Leu Ser Met Leu Asn His Leu Arg Phe Tyr Ile Pro Glu Val
340 345 350

14-03 WO.sequence listing.txt

Phe Pro Ala Leu Lys Lys Val Val Phe Leu Asp Asp Asp Val Val Val
 355 360 365

Gln Lys Asp Leu Ser Ser Leu Phe Ser Ile Asp Leu Asn Lys Asn Val
 370 375 380

Asn Gly Ala Val Glu Thr Cys Met Glu Thr Phe His Arg Tyr His Lys
 385 390 395 400

Tyr Leu Asn Tyr Ser His Pro Leu Ile Arg Ser His Phe Asp Pro Asp
 405 410 415

Ala Cys Gly Trp Ala Phe Gly Met Asn Val Phe Asp Leu Val Glu Trp
 420 425 430

Arg Lys Arg Asn Val Thr Gly Ile Tyr His Tyr Trp Gln Glu Lys Asn
 435 440 445

Val Asp Arg Thr Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Leu
 450 455 460

Thr Phe Tyr Gly Leu Thr Glu Ala Leu Glu Ala Ser Trp His Ile Leu
 465 470 475 480

Gly Leu Gly Tyr Thr Asn Val Asp Ala Arg Val Ile Glu Lys Gly Ala
 485 490 495

Val Leu His Phe Asn Gly Asn Leu Lys Pro Trp Leu Lys Ile Gly Ile
 500 505 510

Glu Lys Tyr Lys Pro Leu Trp Glu Arg Tyr Val Asp Tyr Thr Ser Pro
 515 520 525

Phe Met Gln Gln Cys Asn Phe His
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 <211> 1833
 <212> DNA
 <213> *Arabidopsis thaliana*

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14-03 WO.sequence Listing.txt

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<210> 14
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<212> PRT
<213> *Arabidopsis thaliana*
<400> 14

Met Asn Gln Val Arg Arg Trp Gln Arg Ile Leu Ile Leu Ser Leu Leu
Page 23

1 5 10 15

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35 40 45Ile Thr Asp Lys Thr Glu Asp Glu Leu Arg Leu Thr Ala Ile Glu Gln
50 55 60Asp Glu Glu Gly Leu Lys Glu Pro Lys Arg Ile Leu Gln Asp Arg Asp
65 70 75 80Phe Asn Ser Val Val Leu Ser Asn Ser Ser Asp Lys Ser Asn Asp Thr
85 90 95Val Gln Ser Asn Glu Gly Asp Gln Lys Asn Phe Leu Ser Glu Val Asp
100 105 110Lys Gly Asn Asn His Lys Pro Lys Glu Glu Gln Ala Val Ser Gln Lys
115 120 125Thr Thr Val Ser Ser Asn Ala Glu Val Lys Ile Ser Ala Arg Asp Ile
130 135 140Gln Leu Asn His Lys Thr Glu Phe Arg Pro Pro Ser Ser Lys Ser Glu
145 150 155 160Lys Asn Thr Arg Val Gln Leu Glu Arg Ala Thr Asp Glu Arg Val Lys
165 170 175Glu Ile Arg Asp Lys Ile Ile Gln Ala Lys Ala Tyr Leu Asn Leu Ala
180 185 190Leu Pro Gly Asn Asn Ser Gln Ile Val Lys Glu Leu Arg Val Arg Thr
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210 215 220Pro Lys Ser Ser Pro Asn Arg Leu Lys Ala Met Glu Val Ala Leu Tyr
225 230 235 240Lys Val Ser Arg Ala Phe His Asn Cys Pro Ala Ile Ala Thr Lys Leu
245 250 255

14-03 WO.sequence listing.txt

Gln Ala Met Thr Tyr Lys Thr Glu Glu Gln Ala Arg Ala Gln Lys Lys
260 265 270

Gln Ala Ala Tyr Leu Met Gln Leu Ala Ala Arg Thr Thr Pro Lys Gly
275 280 285

Leu His Cys Leu Ser Met Arg Leu Thr Thr Glu Tyr Phe Thr Leu Asp
290 295 300

His Glu Lys Arg Gln Leu Leu Gln Gln Ser Tyr Asn Asp Pro Asp Leu
305 310 315 320

Tyr His Tyr Val Val Phe Ser Asp Asn Val Leu Ala Ser Ser Val Val
325 330 335

Val Asn Ser Thr Ile Ser Ser Ser Lys Glu Pro Asp Lys Ile Val Phe
340 345 350

His Val Val Thr Asp Ser Leu Asn Tyr Pro Ala Ile Ser Met Trp Phe
355 360 365

Leu Leu Asn Pro Ser Gly Arg Ala Ser Ile Gln Ile Leu Asn Ile Asp
370 375 380

Glu Met Asn Val Leu Pro Leu Tyr His Ala Glu Leu Leu Met Lys Gln
385 390 395 400

Asn Ser Ser Asp Pro Arg Ile Ile Ser Ala Leu Asn His Ala Arg Phe
405 410 415

Tyr Leu Pro Asp Ile Phe Pro Gly Leu Asn Lys Ile Val Leu Phe Asp
420 425 430

His Asp Val Val Val Gln Arg Asp Leu Thr Arg Leu Trp Ser Leu Asp
435 440 445

Met Thr Gly Lys Val Val Gly Ala Val Glu Thr Cys Leu Glu Gly Asp
450 455 460

Pro Ser Tyr Arg Ser Met Asp Ser Phe Ile Asn Phe Ser Asp Ala Trp
465 470 475 480

Val Ser Gln Lys Phe Asp Pro Lys Ala Cys Thr Trp Ala Phe Gly Met
485 490 495

Asn Leu Phe Asp Leu Glu Glu Trp Arg Arg Gln Glu Leu Thr Ser Val
500 505 510

14-03 WO.sequence Listing.txt

Tyr Leu Lys Tyr Phe Asp Leu Gly Val Lys Gly His Leu Trp Lys Ala
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Gly Gly Leu Pro Val Gly Trp Leu Thr Phe Phe Gly Gln Thr Phe Pro
 530 535 540

Leu Glu Lys Arg Trp Asn Val Gly Gly Leu Gly His Glu Ser Gly Leu
 545 550 555 560

Arg Ala Ser Asp Ile Glu Gln Ala Ala Val Ile His Tyr Asp Gly Ile
 565 570 575

Met Lys Pro Trp Leu Asp Ile Gly Ile Asp Lys Tyr Lys Arg Tyr Trp
 580 585 590

Asn Ile His Val Pro Tyr His His Pro His Leu Gln Arg Cys Asn Ile
 595 600 605

His Asp
 610

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 <212> DNA
 <213> *Arabidopsis thaliana*

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 catctc当地
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 ct当地
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14-03 WO.sequence listing.txt

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caaccacttc agagaaaatg	gcacttactt ggactgggtt	atgataaagg aatcgatgtc	1440
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<210> 16

<211> 528

<212> PRT

<213> *Arabidopsis thaliana*

<400> 16

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Arg Phe Gly His Gly Thr Trp Ile Gly Lys Ala Phe Asn Asp Thr Pro
 20 25 30

Glu Met Leu His Glu Arg Ser Leu Arg Gln Glu Lys Arg Leu Glu Arg
 35 40 45

Ala Asn Glu Leu Met Asn Asp Asp Ser Leu Gln Lys Leu Glu Thr Ala
 50 55 60

Ala Met Ala Arg Ser Arg Ser Val Asp Ser Ala Pro Leu Gly Asn Tyr
 65 70 75 80

Thr Ile Trp Lys Asn Glu Tyr Arg Arg Gly Lys Ser Phe Glu Asp Met
 85 90 95

Leu Arg Leu Met Gln Asp Gln Ile Ile Met Ala Arg Val Tyr Ser Gly
 100 105 110

Leu Ala Lys Phe Thr Asn Asn Leu Ala Leu His Gln Glu Ile Glu Thr
 Page 27

14-03 WO.sequence listing.txt
115 120 125Gln Leu Met Lys Leu Ala Trp Glu Glu Glu Ser Thr Asp Ile Asp Gln
130 135 140Glu Gln Arg Val Leu Asp Ser Ile Arg Asp Met Gly Gln Ile Leu Ala
145 150 155 160Arg Ala His Glu Gln Leu Tyr Glu Cys Lys Leu Val Thr Asn Lys Leu
165 170 175Arg Ala Met Leu Gln Thr Val Glu Asp Glu Leu Glu Asn Glu Gln Thr
180 185 190Tyr Ile Thr Phe Leu Thr Gln Leu Ala Ser Lys Ala Leu Pro Asp Ala
195 200 205Ile His Cys Leu Thr Met Arg Leu Asn Leu Glu Tyr His Leu Leu Pro
210 215 220Leu Pro Met Arg Asn Phe Pro Arg Arg Glu Asn Leu Glu Asn Pro Lys
225 230 235 240Leu Tyr His Tyr Ala Leu Phe Ser Asp Asn Val Leu Ala Ala Ser Val
245 250 255Val Val Asn Ser Thr Val Met Asn Ala Gln Asp Pro Ser Arg His Val
260 265 270Phe His Leu Val Thr Asp Lys Leu Asn Phe Gly Ala Met Ser Met Trp
275 280 285Phe Leu Leu Asn Pro Pro Gly Glu Ala Thr Ile His Val Gln Arg Phe
290 295 300Glu Asp Phe Thr Trp Leu Asn Ser Ser Tyr Ser Pro Val Leu Ser Gln
305 310 315 320Leu Glu Ser Ala Ala Met Lys Lys Phe Tyr Phe Lys Thr Ala Arg Ser
325 330 335Glu Ser Val Glu Ser Gly Ser Glu Asn Leu Lys Tyr Arg Tyr Pro Lys
340 345 350Tyr Met Ser Met Leu Asn His Leu Arg Phe Tyr Ile Pro Arg Ile Phe
355 360 365

14-03 WO.sequence listing.txt

Pro Lys Leu Glu Lys Ile Leu Phe Val Asp Asp Asp Val Val Val Gln
 370 375 380 385

Lys Asp Leu Thr Pro Leu Trp Ser Ile Asp Leu Lys Gly Lys Val Asn
 385 390 395 400

Glu Asn Phe Asp Pro Lys Phe Cys Gly Trp Ala Tyr Gly Met Asn Ile
 405 410 415

Phe Asp Leu Lys Glu Trp Lys Lys Asn Asn Ile Thr Glu Thr Tyr His
 420 425 430

Phe Trp Gln Asn Leu Asn Glu Asn Arg Thr Leu Trp Lys Leu Gly Thr
 435 440 445

Leu Pro Pro Gly Leu Ile Thr Phe Tyr Asn Leu Thr Gln Pro Leu Gln
 450 455 460

Arg Lys Trp His Leu Leu Gly Leu Gly Tyr Asp Lys Gly Ile Asp Val
 465 470 475 480

Lys Lys Ile Glu Arg Ser Ala Val Ile His Tyr Asn Gly His Met Lys
 485 490 495

Pro Trp Thr Glu Met Gly Ile Ser Lys Tyr Gln Pro Tyr Trp Thr Lys
 500 505 510

Tyr Thr Asn Phe Asp His Pro Tyr Ile Phe Thr Cys Arg Leu Phe Glu
 515 520 525

<210> 17

<211> 1602

<212> DNA

<213> *Arabidopsis thaliana*

<400> 17

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ctggtttcgg atatgaagaa caaccactat gatgctaaaa catttgcctt cgtatttcga	420
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14-03 WO.sequence listing.txt

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gctcctgcga	ttgttgaagt	gaaaagcggt	catcagttt	attggtaac	aagagagaat	840
gttccagttc	ttgaagctgt	ggaaagccat	aacagtatca	gaaattatta	ccatggaaat	900
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aagccgtggc	ttgagatagg	tttcgagcat	ctcagaccat	tctggacaaa	atatgttaac	1560
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<210> 18

<211> 533

<212> PRT

<213> *Arabidopsis thaliana*

<400> 18

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Ser	Asn	Glu	Phe	Ile	Asp	Leu	Met	Lys	Ile	Lys	Val	Ala	Ala	Arg	His
						20		25			30				

Ile	Ser	Tyr	Arg	Thr	Leu	Phe	His	Thr	Ile	Leu	Ile	Leu	Ala	Phe	Leu
						35		40			45				

Leu	Pro	Phe	Val	Phe	Ile	Leu	Thr	Ala	Val	Val	Thr	Leu	Glu	Gly	Val
					50			55			60				

Asn	Lys	Cys	Ser	Ser	Phe	Asp	Cys	Phe	Gly	Arg	Arg	Leu	Gly	Pro	Arg
65					70				75			80			

14-03 WO.sequence listing.txt

Leu Leu Gly Arg Ile Asp Asp Ser Glu Gln Arg Leu Val Arg Asp Phe
85 90 95

Tyr Lys Ile Leu Asn Glu Val Ser Thr Gln Glu Ile Pro Asp Gly Leu
100 105 110

Lys Leu Pro Glu Ser Phe Ser Gln Leu Val Ser Asp Met Lys Asn Asn
115 120 125

His Tyr Asp Ala Lys Thr Phe Ala Leu Val Phe Arg Ala Met Val Glu
130 135 140

Lys Phe Glu Arg Asp Leu Arg Glu Ser Lys Phe Ala Glu Leu Met Asn
145 150 155 160

Lys His Phe Ala Ala Ser Ser Ile Pro Lys Gly Ile His Cys Leu Ser
165 170 175

Leu Arg Leu Thr Asp Glu Tyr Ser Ser Asn Ala His Ala Arg Arg Gln
180 185 190

Leu Pro Ser Pro Glu Leu Leu Pro Val Leu Ser Asp Asn Ala Tyr His
195 200 205

His Phe Val Leu Ala Thr Asp Asn Ile Leu Ala Ala Ser Val Val Val
210 215 220

Ser Ser Ala Val Gln Ser Ser Ser Lys Pro Glu Lys Ile Val Phe His
225 230 235 240

Val Ile Thr Asp Lys Lys Thr Tyr Ala Gly Met His Ser Trp Phe Ala
245 250 255

Leu Asn Ser Val Ala Pro Ala Ile Val Glu Val Lys Ser Val His Gln
260 265 270

Phe Asp Trp Leu Thr Arg Glu Asn Val Pro Val Leu Glu Ala Val Glu
275 280 285

Ser His Asn Ser Ile Arg Asn Tyr Tyr His Gly Asn His Ile Ala Gly
290 295 300

Ala Asn Leu Ser Glu Thr Thr Pro Arg Thr Phe Ala Ser Lys Leu Gln
305 310 315 320

Ser Arg Ser Pro Lys Tyr Ile Ser Leu Leu Asn His Leu Arg Ile Tyr
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14-03 WO.sequence listing.txt
325 330 335

Leu Pro Glu Leu Phe Pro Asn Leu Asp Lys Val Val Phe Leu Asp Asp
340 345 350

Asp Ile Val Ile Gln Lys Asp Leu Ser Pro Leu Trp Asp Ile Asp Leu
355 360 365

Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp Val
370 375 380

Trp Val Met Ser Lys Arg Leu Arg Asn Tyr Phe Asn Phe Ser His Pro
385 390 395 400

Leu Ile Ala Lys His Leu Asp Pro Glu Glu Cys Ala Trp Ala Tyr Gly
405 410 415

Met Asn Ile Phe Asp Leu Arg Thr Trp Arg Lys Thr Asn Ile Arg Glu
420 425 430

Thr Tyr His Ser Trp Leu Lys Glu Asn Leu Lys Ser Asn Leu Thr Met
435 440 445

Trp Lys Leu Gly Thr Leu Pro Pro Ala Leu Ile Ala Phe Lys Gly His
450 455 460

Val Gln Pro Ile Asp Ser Ser Trp His Met Leu Gly Leu Gly Tyr Gln
465 470 475 480

Ser Lys Thr Asn Leu Glu Asn Ala Lys Lys Ala Ala Val Ile His Tyr
485 490 495

Asn Gly Gln Ser Lys Pro Trp Leu Glu Ile Gly Phe Glu His Leu Arg
500 505 510

Pro Phe Trp Thr Lys Tyr Val Asn Tyr Ser Asn Asp Phe Ile Lys Asn
515 520 525

Cys His Ile Leu Glu
530

<210> 19
<211> 1686
<212> DNA
<213> Arabidopsis thaliana

<400> 19
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14-03 WO.sequence listing.txt

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<211> 561
<212> PRT
<213> *Arabidopsis thaliana*
<400> 20

14-03 WO.sequence listing.txt

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Ser Thr Gly Leu Arg Ser Phe Phe Ser Tyr Arg Ile Phe Ile Ser Ala
20 25 30

Leu Phe Ser Phe Leu Phe Leu Ala Thr Phe Ser Val Val Leu Asn Ser
35 40 45

Ser Arg His Gln Pro His Gln Asp His Thr Leu Pro Ser Met Gly Asn
50 55 60

Ala Tyr Met Gln Arg Thr Phe Leu Ala Leu Gln Ser Asp Pro Leu Lys
65 70 75 80

Thr Arg Leu Asp Leu Ile His Lys Gln Ala Ile Asp His Leu Thr Leu
85 90 95

Val Asn Ala Tyr Ala Ala Tyr Ala Arg Lys Leu Lys Leu Asp Ala Ser
100 105 110

Lys Gln Leu Lys Leu Phe Glu Asp Leu Ala Ile Asn Phe Ser Asp Leu
115 120 125

Gln Ser Lys Pro Gly Leu Lys Ser Ala Val Ser Asp Asn Gly Asn Ala
130 135 140

Leu Glu Glu Asp Ser Phe Arg Gln Leu Glu Lys Glu Val Lys Asp Lys
145 150 155 160

Val Lys Thr Ala Arg Met Met Ile Val Glu Ser Lys Glu Ser Tyr Asp
165 170 175

Thr Gln Leu Lys Ile Gln Lys Leu Lys Asp Thr Ile Phe Ala Val Gln
180 185 190

Glu Gln Leu Thr Lys Ala Lys Lys Asn Gly Ala Val Ala Ser Leu Ile
195 200 205

Ser Ala Lys Ser Val Pro Lys Ser Leu His Cys Leu Ala Met Arg Leu
210 215 220

Val Gly Glu Arg Ile Ser Asn Pro Glu Lys Tyr Lys Asp Ala Pro Pro
225 230 235 240

Asp Pro Ala Ala Glu Asp Pro Thr Leu Tyr His Tyr Ala Ile Phe Ser
245 250 255

14-03 WO.sequence listing.txt

Asp Asn Val Ile Ala Val Ser Val Val Val Arg Ser Val Val Met Asn
260 265 270

Ala Glu Glu Pro Trp Lys His Val Phe His Val Val Thr Asp Arg Met
275 280 285

Asn Leu Ala Ala Met Lys Val Trp Phe Lys Met Arg Pro Leu Asp Arg
290 295 300

Gly Ala His Val Glu Ile Lys Ser Val Glu Asp Phe Lys Phe Leu Asn
305 310 315 320

Ser Ser Tyr Ala Pro Val Leu Arg Gln Leu Glu Ser Ala Lys Leu Gln
325 330 335

Lys Phe Tyr Phe Glu Asn Gln Ala Glu Asn Ala Thr Lys Asp Ser His
340 345 350

Asn Leu Lys Phe Lys Asn Pro Lys Tyr Leu Ser Met Leu Asn His Leu
355 360 365

Arg Phe Tyr Leu Pro Glu Met Tyr Pro Lys Leu Asn Lys Ile Leu Phe
370 375 380

Leu Asp Asp Asp Val Val Gln Lys Asp Val Thr Gly Leu Trp Lys
385 390 395 400

Ile Asn Leu Asp Gly Lys Val Asn Gly Ala Val Glu Thr Cys Phe Gly
405 410 415

Ser Phe His Arg Tyr Gly Gln Tyr Leu Asn Phe Ser His Pro Leu Ile
420 425 430

Lys Glu Asn Phe Asn Pro Ser Ala Cys Ala Trp Ala Phe Gly Met Asn
435 440 445

Ile Phe Asp Leu Asn Ala Trp Arg Arg Glu Lys Cys Thr Asp Gln Tyr
450 455 460

His Tyr Trp Gln Asn Leu Asn Glu Asp Arg Thr Leu Trp Lys Leu Gly
465 470 475 480

Thr Leu Pro Pro Gly Leu Ile Thr Phe Tyr Ser Lys Thr Lys Ser Leu
485 490 495

Asp Lys Ser Trp His Val Leu Gly Leu Gly Tyr Asn Pro Gly Val Ser

500 14-03 wo.sequence listing.txt
505 510

Met Asp Glu Ile Arg Asn Ala Gly Val Ile His Tyr Asn Gly Asn Met
515 520 525

Lys Pro Trp Leu Asp Ile Ala Met Asn Gln Tyr Lys Ser Leu Trp Thr
530 535 540

Lys Tyr Val Asp Asn Glu Met Glu Phe Val Gln Met Cys Asn Phe Gly
545 550 555 560

Leu

<210> 21
<211> 1680
<212> DNA
<213> *Arabidopsis thaliana*

<400> 11
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cgggagctcg aggatccgaa tctttaccat tacgctatat tttcggataa tgtgattgcg 780
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aagctcgaga atgcgcacgaa agataccacg aatatgaagt tcaggaaccc caagtattta 1080
tctatattga atcacttgag gttttattta cccgagatgt accccaaact acataggata 1140

14-03 WO.sequence listing.txt

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cttgggctgg	tttacaatcc gacattagc	atggatgaga tccgcaacgc	1560
cacttcaacg	gtaacatgaa gccatggctt	gacatagcta tgaaccagtt	1620
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<210> 22

<211> 559

<212> PRT

<213> *Arabidopsis thaliana*

<400> 22

Met	Ala	Asn	His	His	Arg	Leu	Leu	Arg	Gly	Gly	Gly	Ser	Pro	Ala	Ile
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Ile	Gly	Gly	Arg	Ile	Thr	Leu	Thr	Ala	Phe	Ala	Ser	Thr	Ile	Ala	Leu
				20			25						30		

Phe	Leu	Phe	Thr	Leu	Ser	Phe	Phe	Ala	Ser	Asp	Ser	Asn	Asp	Ser
					35		40			45				

Pro	Asp	Leu	Leu	Leu	Pro	Gly	Val	Glu	Tyr	Ser	Asn	Gly	Val	Gly	Ser
					50		55			60					

Arg	Arg	Ser	Met	Leu	Asp	Ile	Lys	Ser	Asp	Pro	Leu	Lys	Pro	Arg	Leu
			65		70			75					80		

Ile	Gln	Ile	Arg	Lys	Gln	Ala	Asp	Asp	His	Arg	Ser	Leu	Ala	Leu	Ala
				85				90				95			

Tyr	Ala	Ser	Tyr	Ala	Arg	Lys	Leu	Lys	Leu	Glu	Asn	Ser	Lys	Leu	Val
			100				105					110			

Arg	Ile	Phe	Ala	Asp	Leu	Ser	Arg	Asn	Tyr	Thr	Asp	Leu	Ile	Asn	Lys
					115		120			125					

Pro	Thr	Tyr	Arg	Ala	Leu	Tyr	Asp	Ser	Asp	Gly	Ala	Ser	Ile	Glu	Glu
					130		135			140					

Ser	Val	Leu	Arg	Gln	Phe	Glu	Lys	Glu	Val	Lys	Glu	Arg	Ile	Lys	Met

14-03 WO.sequence listing.txt
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165 170 175
Lys Ile Gln Lys Leu Lys Asp Thr Ile Phe Ala Val Asn Glu Gln Leu
180 185 190
Thr Asn Ala Lys Lys Gln Gly Ala Phe Ser Ser Leu Ile Ala Ala Lys
195 200 205
Ser Ile Pro Lys Gly Leu His Cys Leu Ala Met Arg Leu Met Glu Glu
210 215 220
Arg Ile Ala His Pro Glu Lys Tyr Thr Asp Glu Gly Lys Asp Arg Pro
225 230 235 240
Arg Glu Leu Glu Asp Pro Asn Leu Tyr His Tyr Ala Ile Phe Ser Asp
245 250 255
Asn Val Ile Ala Ala Ser Val Val Val Asn Ser Ala Val Lys Asn Ala
260 265 270
Lys Glu Pro Trp Lys His Val Phe His Val Val Thr Asp Lys Met Asn
275 280 285
Leu Gly Ala Met Gln Val Met Phe Lys Leu Lys Glu Tyr Lys Gly Ala
290 295 300
His Val Glu Val Lys Ala Val Glu Asp Tyr Thr Phe Leu Asn Ser Ser
305 310 320
Tyr Val Pro Val Leu Lys Gln Leu Glu Ser Ala Asn Leu Gln Lys Phe
325 330 335
Tyr Phe Glu Asn Lys Leu Glu Asn Ala Thr Lys Asp Thr Thr Asn Met
340 345 350
Lys Phe Arg Asn Pro Lys Tyr Leu Ser Ile Leu Asn His Leu Arg Phe
355 360 365
Tyr Leu Pro Glu Met Tyr Pro Lys Leu His Arg Ile Leu Phe Leu Asp
370 375 380
Asp Asp Val Val Val Gln Lys Asp Leu Thr Gly Leu Trp Glu Ile Asp
385 390 395 400

14-03 WO.sequence listing.txt

Met Asp Gly Lys Val Asn Gly Ala Val Glu Thr Cys Phe Gly Ser Phe
 405 410 415

His Arg Tyr Ala Gln Tyr Met Asn Phe Ser His Pro Leu Ile Lys Glu
 420 425 430

Lys Phe Asn Pro Lys Ala Cys Ala Trp Ala Tyr Gly Met Asn Phe Phe
 435 440 445

Asp Leu Asp Ala Trp Arg Arg Glu Lys Cys Thr Glu Glu Tyr His Tyr
 450 455 460

Trp Gln Asn Leu Asn Glu Asn Arg Ala Leu Trp Lys Leu Gly Thr Leu
 465 470 475 480

Pro Pro Gly Leu Ile Thr Phe Tyr Ser Thr Thr Lys Pro Leu Asp Lys
 485 490 495

Ser Trp His Val Leu Gly Leu Gly Tyr Asn Pro Ser Ile Ser Met Asp
 500 505 510

Glu Ile Arg Asn Ala Ala Val Val His Phe Asn Gly Asn Met Lys Pro
 515 520 525

Trp Leu Asp Ile Ala Met Asn Gln Phe Arg Pro Leu Trp Thr Lys His
 530 535 540

Val Asp Tyr Asp Leu Glu Phe Val Gln Ala Cys Asn Phe Gly Leu
 545 550 555

<210> 23

<211> 1623

<212> DNA

<213> *Arabidopsis thaliana*

<400> 23

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ttcgtcaggt tcgcgtttct cgtcctcgaa tctgcctccg tttgcgattc accactcgat 240

tgcattggac tcagactttt ccgtgggggc gacacatctc taaaaattgg ggaagagttg 300

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ggatcattgg agtcattcga cgaccattgtt aaggagatga cgttaaaacg ccgtgacata 420

agggcgtttt cttccgtgac taagaagatg ctgttgacaga tggAACGtaa agtccaatca 480

gcaaaacatc atgagttgt gtactggcat ttagcctctc acggatttcc taaaaggcctc 540

14-03 WO.sequence listing.txt

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ctgactgaca	atgtccttgc	tgcctctgtc	gtcatatcgt	ctactgtaca	aaacgctgtg	720
aatcccgaga	agtttgtctt	tcatattgtt	accgataaga	aaacctatac	ccctatgcat	780
gcttggtttg	ctatcaactc	tgcttcatca	ccagttgtt	aagtaaaagg	acttcatcag	840
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gtagtacaga	gcgatcttc	gtcttatgg	gaaacggatc	tcaacggtaa	agttgttgg	1140
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tctacatggc	taagactcag	tgttaggtca	ggactacaat	tatggcaacc	aggggcttta	1380
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<210> 24

<211> 540

<212> PRT

<213> *Arabidopsis thaliana*

<400> 24

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Asn	Pro	Gly	Val	Gly	Ile	Gly	Lys	Gly	Ser	Gly	Gly	Cys	Ala	Ala	Ala
			20				25					30			

Ala	Ala	Ala	Leu	Ala	Ala	Arg	Arg	Phe	Ser	Ser	Arg	Thr	Leu	Leu	Leu
			35			40					45				

Leu	Leu	Leu	Leu	Leu	Ala	Ile	Val	Leu	Pro	Phe	Ile	Phe	Val	Arg	Phe
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14-03 WO.sequence listing.txt

Ala Phe Leu Val Leu Glu Ser Ala Ser Val Cys Asp Ser Pro Leu Asp
65 70 75 80

Cys Met Gly Leu Arg Leu Phe Arg Gly Gly Asp Thr Ser Leu Lys Ile
85 90 95

Gly Glu Glu Leu Thr Arg Ala Leu Val Glu Glu Thr Thr Asp His Gln
100 105 110

Asp Val Asn Gly Arg Gly Thr Lys Gly Ser Leu Glu Ser Phe Asp Asp
115 120 125

Leu Val Lys Glu Met Thr Leu Lys Arg Arg Asp Ile Arg Ala Phe Ala
130 135 140

Ser Val Thr Lys Lys Met Leu Leu Gln Met Glu Arg Lys Val Gln Ser
145 150 155 160

Ala Lys His His Glu Leu Val Tyr Trp His Leu Ala Ser His Gly Ile
165 170 175

Pro Lys Ser Leu His Cys Leu Ser Leu Arg Leu Thr Glu Glu Tyr Ser
180 185 190

Val Asn Ala Met Ala Arg Met Arg Leu Pro Pro Pro Glu Ser Val Ser
195 200 205

Arg Leu Thr Asp Pro Ser Phe His His Ile Val Leu Leu Thr Asp Asn
210 215 220

Val Leu Ala Ala Ser Val Val Ile Ser Ser Thr Val Gln Asn Ala Val
225 230 235 240

Asn Pro Glu Lys Phe Val Phe His Ile Val Thr Asp Lys Lys Thr Tyr
245 250 255

Thr Pro Met His Ala Trp Phe Ala Ile Asn Ser Ala Ser Ser Pro Val
260 265 270

Val Glu Val Lys Gly Leu His Gln Tyr Asp Trp Pro Gln Glu Val Asn
275 280 285

Phe Lys Val Arg Glu Met Leu Asp Ile His Arg Leu Ile Trp Arg Arg
290 295 300

His Tyr Gln Asn Leu Lys Asp Ser Asp Phe Ser Phe Val Glu Gly Thr
305 310 315 320

14-03 WO.sequence Listing.txt

His Glu Gln Ser Leu Gln Ala Leu Asn Pro Ser Cys Leu Ala Leu Leu
325 330 335

Asn His Leu Arg Ile Tyr Ile Pro Lys Leu Phe Pro Asp Leu Asn Lys
340 345 350

Ile Val Leu Leu Asp Asp Asp Val Val Val Gln Ser Asp Leu Ser Ser
355 360 365

Leu Trp Glu Thr Asp Leu Asn Gly Lys Val Val Gly Ala Val Val Asp
370 375 380

Ser Trp Cys Gly Asp Asn Cys Cys Pro Gly Arg Lys Tyr Lys Asp Tyr
385 390 395 400

Phe Asn Phe Ser His Pro Leu Ile Ser Ser Asn Leu Val Gln Glu Asp
405 410 415

Cys Ala Trp Leu Ser Gly Met Asn Val Phe Asp Leu Lys Ala Trp Arg
420 425 430

Gln Thr Asn Ile Thr Glu Ala Tyr Ser Thr Trp Leu Arg Leu Ser Val
435 440 445

Arg Ser Gly Leu Gln Leu Trp Gln Pro Gly Ala Leu Pro Pro Thr Leu
450 455 460

Leu Ala Phe Lys Gly Leu Thr Gln Ser Leu Glu Pro Ser Trp His Val
465 470 475 480

Ala Gly Leu Gly Ser Arg Ser Val Lys Ser Pro Gln Glu Ile Leu Lys
485 490 495

Ser Ala Ser Val Leu His Phe Ser Gly Pro Ala Lys Pro Trp Leu Glu
500 505 510

Ile Ser Asn Pro Glu Val Arg Ser Leu Trp Tyr Arg Tyr Val Asn Ser
515 520 525

Ser Asp Ile Phe Val Arg Lys Cys Lys Ile Met Asn
530 535 540

<210> 25

<211> 2043

<212> DNA

<213> *Arabidopsis thaliana*

<400> 25

14-03 WO.sequence listing.txt

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gatccagatc taaaagatgt	gaacatagtt gcgacataca	gtgaccatta cggcaatata	240
cgccctggta gggtaaaaat	gggggatctt tcacccctt	gggtttgga gaatcctgcc	300
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cgtcaggaaa ggagaggtca	acgaacttta gagctgatcc	gacaagaaaa ggaaactgat	540
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aaatacagta tatggaggag	agactatgag agcccaaata	ctgatgctat cttgaagctt	660
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ttgccaccgg ggctgataac	attttacaac ctgacgtatg	caatggatag gagctggcac	1860
gtacttagggc tggatatga	cccagcgcta aaccaaacag	caatagagaa tgcagcggt	1920

14-03 WO.sequence listing.txt

gtgcattaca atgggaacta caagccatgg ctgggttag cattcgccaa gtacaaaccg 1980
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tga 2043

<210> 26
<211> 680
<212> PRT
<213> *Arabidopsis thaliana*
<400> 26

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Leu His Ala Val His Val Gly Gly Ala Ile Leu Glu Ser Gln Ala Pro
20 25 30

His Arg Glu Leu Lys Ala Tyr Arg Pro Leu Gln Asp Asn Asn Leu Gln
35 40 45

Glu Val Tyr Ala Ser Ser Ala Ala Ala Val His Tyr Asp Pro Asp Leu
50 55 60

Lys Asp Val Asn Ile Val Ala Thr Tyr Ser Asp His Tyr Gly Asn Ile
65 70 75 80

Arg Leu Gly Arg Val Lys Met Gly Asp Leu Ser Pro Ser Trp Val Leu
85 90 95

Glu Asn Pro Ala Tyr Gln Val Ser Arg Lys Thr Lys Gly Ser Gln Leu
100 105 110

Val Ile Pro Arg Asp Ser Phe Gln Asn Asp Thr Gly Met Glu Asp Asn
115 120 125

Ala Ser His Ser Thr Thr Asn Gln Thr Asp Glu Ser Glu Asn Gln Phe
130 135 140

Pro Asn Val Asp Phe Ala Ser Pro Ala Lys Leu Lys Arg Gln Ile Leu
145 150 155 160

Arg Gln Glu Arg Arg Gly Gln Arg Thr Leu Glu Leu Ile Arg Gln Glu
165 170 175

Lys Glu Thr Asp Glu Gln Met Gln Glu Ala Ala Ile Gln Lys Ser Met
180 185 190

14-03 WO.sequence listing.txt
Ser Phe Glu Asn Ser Val Ile Gly Lys Tyr Ser Ile Trp Arg Arg Asp
195 200 205
Tyr Glu Ser Pro Asn Ala Asp Ala Ile Leu Lys Leu Met Arg Asp Gln
210 215 220
Ile Ile Met Ala Lys Ala Tyr Ala Asn Ile Ala Lys Ser Lys Asn Val
225 230 235 240
Thr Asn Leu Tyr Val Phe Leu Met Gln Gln Cys Gly Glu Asn Lys Arg
245 250 255
Val Ile Gly Lys Ala Thr Ser Asp Ala Asp Leu Pro Ser Ser Ala Leu
260 265 270
Asp Gln Ala Lys Ala Met Gly His Ala Leu Ser Leu Ala Lys Asp Glu
275 280 285
Leu Tyr Asp Cys His Glu Leu Ala Lys Lys Phe Arg Ala Ile Leu Gln
290 295 300
Ser Thr Glu Arg Lys Val Asp Gly Leu Lys Lys Lys Gly Thr Phe Leu
305 310 315 320
Ile Gln Leu Ala Ala Lys Thr Phe Pro Lys Pro Leu His Cys Leu Ser
325 330 335
Leu Gln Leu Ala Ala Asp Tyr Phe Ile Leu Gly Phe Asn Glu Glu Asp
340 345 350
Ala Val Lys Glu Asp Val Ser Gln Lys Lys Leu Glu Asp Pro Ser Leu
355 360 365
Tyr His Tyr Ala Ile Phe Ser Asp Asn Val Leu Ala Thr Ser Val Val
370 375 380
Val Asn Ser Thr Val Leu Asn Ala Lys Glu Pro Gln Arg His Val Phe
385 390 395 400
His Ile Val Thr Asp Lys Leu Asn Phe Gly Ala Met Lys Met Trp Phe
405 410 415
Arg Ile Asn Ala Pro Ala Asp Ala Thr Ile Gln Val Glu Asn Ile Asn
420 425 430
Asp Phe Lys Trp Leu Asn Ser Ser Tyr Cys Ser Val Leu Arg Gln Leu
435 440 445

14-03 WO.sequence listing.txt

Glu Ser Ala Arg Leu Lys Glu Tyr Tyr Phe Lys Ala Asn His Pro Ser
450 455 460

Ser Ile Ser Ala Gly Ala Asp Asn Leu Lys Tyr Arg Asn Pro Lys Tyr
465 470 475 480

Leu Ser Met Leu Asn His Leu Arg Phe Tyr Leu Pro Glu Val Tyr Pro
485 490 495

Lys Leu Glu Lys Ile Leu Phe Leu Asp Asp Asp Ile Val Val Gln Lys
500 505 510

Asp Leu Ala Pro Leu Trp Glu Ile Asp Met Gln Gly Lys Val Asn Gly
515 520 525

Ala Val Glu Thr Cys Lys Glu Ser Phe His Arg Phe Asp Lys Tyr Leu
530 535 540

Asn Phe Ser Asn Pro Lys Ile Ser Glu Asn Phe Asp Ala Gly Ala Cys
545 550 555 560

Gly Trp Ala Phe Gly Met Asn Met Phe Asp Leu Lys Glu Trp Arg Lys
565 570 575

Arg Asn Ile Thr Gly Ile Tyr His Tyr Trp Gln Asp Leu Asn Glu Asp
580 585 590

Arg Thr Leu Trp Lys Leu Gly Ser Leu Pro Pro Gly Leu Ile Thr Phe
595 600 605

Tyr Asn Leu Thr Tyr Ala Met Asp Arg Ser Trp His Val Leu Gly Leu
610 615 620

Gly Tyr Asp Pro Ala Leu Asn Gln Thr Ala Ile Glu Asn Ala Ala Val
625 630 635 640

Val His Tyr Asn Gly Asn Tyr Lys Pro Trp Leu Gly Leu Ala Phe Ala
645 650 655

Lys Tyr Lys Pro Tyr Trp Ser Lys Tyr Val Glu Tyr Asp Asn Pro Tyr
660 665 670

Leu Arg Arg Cys Asp Ile Asn Glu
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<210> 27
<211> 1599

14-03 WO.sequence listing.txt

<212> DNA

<213> *Arabidopsis thaliana*

<400> 27

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ccatggctgg agattggttt	cgagcatctg	cggccattct	ggaccaaata	cgtcaactac	1560
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<210> 28

<211> 532

<212> PRT

<213> *Arabidopsis thaliana*

14-03 WO.sequence listing.txt

<400> 28

Met Gln Leu His Ile Ser Pro Ser Met Arg Ser Ile Thr Ile Ser Ser
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Ser Asn Glu Phe Ile Asp Leu Met Lys Ile Lys Val Ala Ala Arg His
20 25 30

Ile Ser Tyr Arg Thr Leu Phe His Thr Ile Leu Ile Leu Ala Phe Leu
35 40 45

Leu Pro Phe Val Phe Ile Leu Thr Ala Val Val Thr Leu Glu Gly Val
50 55 60

Asn Lys Cys Ser Ser Ile Asp Cys Leu Gly Arg Arg Ile Gly Pro Arg
65 70 75 80

Leu Leu Gly Arg Val Asp Asp Ser Glu Arg Leu Ala Arg Asp Phe Tyr
85 90 95

Lys Ile Leu Asn Glu Val Ser Thr Gln Glu Ile Pro Asp Gly Leu Lys
100 105 110

Leu Pro Asn Ser Phe Ser Gln Leu Val Ser Asp Met Lys Asn Asn His
115 120 125

Tyr Asp Ala Lys Thr Phe Ala Leu Val Leu Arg Ala Met Met Glu Lys
130 135 140

Phe Glu Arg Asp Met Arg Glu Ser Lys Phe Ala Glu Leu Met Asn Lys
145 150 155 160

His Phe Ala Ala Ser Ser Ile Pro Lys Gly Ile His Cys Leu Ser Leu
165 170 175

Arg Leu Thr Asp Glu Tyr Ser Ser Asn Ala His Ala Arg Arg Gln Leu
180 185 190

Pro Ser Pro Glu Phe Leu Pro Val Leu Ser Asp Asn Ala Tyr His His
195 200 205

Phe Ile Leu Ser Thr Asp Asn Ile Leu Ala Ala Ser Val Val Val Ser
210 215 220

Ser Ala Val Gln Ser Ser Ser Lys Pro Glu Lys Ile Val Phe His Ile
225 230 235 240

14-03 WO.sequence listing.txt
Ile Thr Asp Lys Lys Thr Tyr Ala Gly Met His Ser Trp Phe Ala Leu
245 250 255

Asn Ser Val Ala Pro Ala Ile Val Glu Val Lys Gly Val His Gln Phe
260 265 270

Asp Trp Leu Thr Arg Glu Asn Val Pro Val Leu Glu Ala Val Glu Ser
275 280 285

His Asn Gly Val Arg Asp Tyr Tyr His Gly Asn His Val Ala Gly Ala
290 295 300

Asn Leu Thr Glu Thr Pro Arg Thr Phe Ala Ser Lys Leu Gln Ser
305 310 315 320

Arg Ser Pro Lys Tyr Ile Ser Leu Leu Asn His Leu Arg Ile Tyr Ile
325 330 335

Pro Glu Leu Phe Pro Asn Leu Asp Lys Val Val Phe Leu Asp Asp Asp
340 345 350

Ile Val Val Gln Gly Asp Leu Thr Pro Leu Trp Asp Val Asp Leu Gly
355 360 365

Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp Glu Trp
370 375 380

Val Met Ser Lys Arg Leu Arg Asn Tyr Phe Asn Phe Ser His Pro Leu
385 390 395 400

Ile Ala Lys His Leu Asp Pro Glu Glu Cys Ala Trp Ala Tyr Gly Met
405 410 415

Asn Ile Phe Asp Leu Gln Ala Trp Arg Lys Thr Asn Ile Arg Glu Thr
420 425 430

Tyr His Ser Trp Leu Arg Glu Asn Leu Lys Ser Asn Leu Thr Met Trp
435 440 445

Lys Leu Gly Thr Leu Pro Pro Ala Leu Ile Ala Phe Lys Gly His Val
450 455 460

His Ile Ile Asp Ser Ser Trp His Met Leu Gly Leu Gly Tyr Gln Ser
465 470 475 480

Lys Thr Asn Ile Glu Asn Val Lys Lys Ala Ala Val Ile His Tyr Asn
485 490 495

14-03 WO.sequence listing.txt

Gly Gln Ser Lys Pro Trp Leu Glu Ile Gly Phe Glu His Leu Arg Pro
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Phe Trp Thr Lys Tyr Val Asn Tyr Ser Asn Asp Phe Ile Lys Asn Cys
 515 520 525

His Ile Leu Glu
 530

<210> 29
 <211> 1608
 <212> DNA
 <213> *Arabidopsis thaliana*

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ccgacaattt ccaaaaactt caatccagag gaatgtgcat gggcttatgg aatgaatgtt	1260
ttcgacccatcg cggcttggag gaggactaacataagctcca cttactatca ttggcttgc	1320

14-03 WO.sequence listing.txt

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caagagacca cgagctatgc cgatgtgaa agtggcgctg ttgttcattt caatggaaga 1500
gctaaggcctt ggctggatat agcatttcct catctacgtc ctctctggc taagtatctt 1560
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<210> 30

<211> 535

<212> PRT

<213> *Arabidopsis thaliana*

<400> 30

Met Gln Leu His Ile Ser Pro Ser Leu Arg His Val Thr Val Val Thr
1 5 10 15

Gly Lys Gly Leu Arg Glu Phe Ile Lys Val Lys Val Gly Ser Arg Arg
20 25 30

Phe Ser Tyr Gln Met Val Phe Tyr Ser Leu Leu Phe Phe Thr Phe Leu
35 40 45

Leu Arg Phe Val Phe Val Leu Ser Thr Val Asp Thr Ile Asp Gly Asp
50 55 60

Pro Ser Pro Cys Ser Ser Leu Ala Cys Leu Gly Lys Arg Leu Lys Pro
65 70 75 80

Lys Leu Leu Gly Arg Arg Val Asp Ser Gly Asn Val Pro Glu Ala Met
85 90 95

Tyr Gln Val Leu Glu Gln Pro Leu Ser Glu Gln Glu Leu Lys Gly Arg
100 105 110

Ser Asp Ile Pro Gln Thr Leu Gln Asp Phe Met Ser Glu Val Lys Arg
115 120 125

Ser Lys Ser Asp Ala Arg Glu Phe Ala Gln Lys Leu Lys Glu Met Val
130 135 140

Thr Leu Met Glu Gln Arg Thr Arg Thr Ala Lys Ile Gln Glu Tyr Leu
145 150 155 160

Tyr Arg His Val Ala Ser Ser Ile Pro Lys Gln Leu His Cys Leu
165 170 175

Ala Leu Lys Leu Ala Asn Glu His Ser Ile Asn Ala Ala Arg Leu
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14-03 WO.sequence listing.txt
180 185 190

Gln Leu Pro Glu Ala Glu Leu Val Pro Met Leu Val Asp Asn Asn Tyr
195 200 205

Phe His Phe Val Leu Ala Ser Asp Asn Ile Leu Ala Ala Ser Val Val
210 215 220

Ala Lys Ser Leu Val Gln Asn Ala Leu Arg Pro His Lys Ile Val Leu
225 230 235 240

His Ile Ile Thr Asp Arg Lys Thr Tyr Phe Pro Met Gln Ala Trp Phe
245 250 255

Ser Leu His Pro Leu Ser Pro Ala Ile Ile Glu Val Lys Ala Leu His
260 265 270

His Phe Asp Trp Leu Ser Lys Gly Lys Val Pro Val Leu Glu Ala Met
275 280 285

Glu Lys Asp Gln Arg Val Arg Ser Gln Phe Arg Gly Gly Ser Ser Val
290 295 300

Ile Val Ala Asn Asn Lys Glu Asn Pro Val Val Val Ala Ala Lys Leu
305 310 315 320

Gln Ala Leu Ser Pro Lys Tyr Asn Ser Leu Met Asn His Ile Arg Ile
325 330 335

His Leu Pro Glu Leu Phe Pro Ser Leu Asn Lys Val Val Phe Leu Asp
340 345 350

Asp Asp Ile Val Ile Gln Thr Asp Leu Ser Pro Leu Trp Asp Ile Asp
355 360 365

Met Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp
370 375 380

Lys Phe Val Met Ser Lys Lys Phe Lys Ser Tyr Leu Asn Phe Ser Asn
385 390 395 400

Pro Thr Ile Ala Lys Asn Phe Asn Pro Glu Glu Cys Ala Trp Ala Tyr
405 410 415

Gly Met Asn Val Phe Asp Leu Ala Ala Trp Arg Arg Thr Asn Ile Ser
420 425 430

14-03 WO.sequence listing.txt

Ser Thr Tyr Tyr His Trp Leu Asp Glu Asn Leu Lys Ser Asp Leu Ser
 435 440 445

Leu Trp Gln Leu Gly Thr Leu Pro Pro Gly Leu Ile Ala Phe His Gly
 450 455 460

His Val Gln Thr Ile Asp Pro Phe Trp His Met Leu Gly Leu Gly Tyr
 465 470 475 480

Gln Glu Thr Thr Ser Tyr Ala Asp Ala Glu Ser Ala Ala Val Val His
 485 490 495

Phe Asn Gly Arg Ala Lys Pro Trp Leu Asp Ile Ala Phe Pro His Leu
 500 505 510

Arg Pro Leu Trp Ala Lys Tyr Leu Asp Ser Ser Asp Arg Phe Ile Lys
 515 520 525

Ser Cys His Ile Arg Ala Ser
 530 535

<210> 31
 <211> 1086
 <212> DNA
 <213> *Arabidopsis thaliana*

<400> 31
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 gacgaattca aaccccaaca aaactccgat tactccctt tcagagaatc tccaaatgttcc
 cgttaacgccc aacaatgcag atcttccggc gaagattccg gcgtctgtt ccctaatctc
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 tcgatccctcc agcactcaat gtgccttcaa agcgttttcc tccacttcc tctccctcc
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 :aataacttca ccggagggtt ttgggtcagat aagaggtt a cgggacgtt caaaggagg
 :acccttggt acttcaatac tgggttaatg gtgattgatt tgaagaagt g g g a a a t t
 :ggttcacga aacgaattga gaaatggatg gagattcaga agatagagag gatttatgag
 :ttggttctc ttccctccgtt tcttctggta tttgctggtc atgttagctcc gatttcacat

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14-03 WO.sequence listing.txt

cggtggaatc aacatggcgt tggtggtgat aatgttagag gtagttgccg tgatttgcatt 960
 tctggtcctg ttagttgct tcactggtca gtagtggtt agccatggtt aagactcgat 1020
 tccaaagcttc catgtccttt agacacattt tgggcacccctt atgatttgcataaaacactcc 1080
 cattga 1086

<210> 32
 <211> 361
 <212> PRT
 <213> *Arabidopsis thaliana*
 <400> 32

Met His Trp Ile Thr Arg Phe Ser Ala Phe Phe Ser Ala Ala Leu Ala
 1 5 10 15

Met Ile Leu Leu Ser Pro Ser Leu Gln Ser Phe Ser Pro Ala Ala Ala
 20 25 30

Ile Arg Ser Ser His Pro Tyr Ala Asp Glu Phe Lys Pro Gln Gln Asn
 35 40 45

Ser Asp Tyr Ser Ser Phe Arg Glu Ser Pro Met Phe Arg Asn Ala Glu
 50 55 60

Gln Cys Arg Ser Ser Gly Glu Asp Ser Gly Val Cys Asn Pro Asn Leu
 65 70 75 80

Val His Val Ala Ile Thr Leu Asp Ile Asp Tyr Leu Arg Gly Ser Ile
 85 90 95

Ala Ala Val Asn Ser Ile Leu Gln His Ser Met Cys Pro Gln Ser Val
 100 105 110

Phe Phe His Phe Leu Val Ser Ser Glu Ser Gln Asn Leu Glu Ser Leu
 115 120 125

Ile Arg Ser Thr Phe Pro Lys Leu Thr Asn Leu Lys Ile Tyr Tyr Phe
 130 135 140

Ala Pro Glu Thr Val Gln Ser Leu Ile Ser Ser Val Arg Gln Ala
 145 150 155 160

Leu Glu Gln Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala Asp Leu Leu
 165 170 175

Glu Pro Cys Val Lys Arg Val Ile Tyr Leu Asp Ser Asp Leu Val Val
 180 185 190

14-03 WO.sequence listing.txt

Val Asp Asp Ile Val Lys Leu Trp Lys Thr Gly Leu Gly Gln Arg Thr
 195 200 205

Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe Thr
 210 215 220

Gly Gly Phe Trp Ser Asp Lys Arg Phe Asn Gly Thr Phe Lys Gly Arg
 225 230 235 240

Asn Pro Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu Lys Lys
 245 250 255

Trp Arg Gln Phe Arg Phe Thr Lys Arg Ile Glu Lys Trp Met Glu Ile
 260 265 270

Gln Lys Ile Glu Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu
 275 280 285

Leu Val Phe Ala Gly His Val Ala Pro Ile Ser His Arg Trp Asn Gln
 290 295 300

His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu His
 305 310 315 320

Ser Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro Trp
 325 330 335

Leu Arg Leu Asp Ser Lys Leu Pro Cys Pro Leu Asp Thr Leu Trp Ala
 340 345 350

Pro Tyr Asp Leu Tyr Lys His Ser His
 355 360

<210> 33

<211> 1038

<212> DNA

<213> Arabidopsis thaliana

<400> 33

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ttcacagtca ctctcactga cctcccccgcg tttcgtgaag ctccggcggt tcgaaacggc 120

tgagaatgct ccaaaacgac atggataacct tcggatcacg aacacaaccc atcaatcatc 180

:acatcgcta tgactctcga cgcaatttac ctccgtggct cagtcgccgg cgtttctcc 240

tttctccaac acgcttcttg tcctgaaaac atcgaaaaac attcatcgc cactcaccgt 300

:gcagcgccg atctccgccc cataatctcc tcaacattcc catacctaac ctaccacatt 360

14-03 WO.sequence listing.txt

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gaccaaccgt taaactacgc tcggatctac	ctcgccgatc tcctcccaat cgccgtccgc	480
cgcgtaatct acttcgactc cgatctcgta	gtcgtcgatg acgtggctaa actctggaga	540
atcgatctac gtcggcacgt cgtcggagct	ccggagact gtcacgcgaa tttcaactaac	600
tacttcactt caagattctg gtcgagtcaa	ggttacaaat cggcggtgaa agataggaaa	660
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tggaaatcagc atggtcttgg tggtgataac	ttggaaaggac tttgccggaa tttgcaccca	900
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<210> 34

<211> 345

<212> PRT

<213> *Arabidopsis thaliana*

<400> 34

Met Ser Ser Leu Arg Leu Arg Leu Cys	Leu Leu Leu Leu Leu Pro Ile
1 5	10 15

Thr Ile Ser Cys Val Thr Val	Leu Thr Asp Leu Pro Ala Phe Arg
20 25	30

Glu Ala Pro Ala Phe Arg Asn	Gly Arg Glu Cys Ser Lys Thr Thr Trp
35 40	45

Ile Pro Ser Asp His Glu His Asn Pro Ser Ile Ile His Ile Ala Met
50 55 60

Thr Leu Asp Ala Ile Tyr Leu Arg Gly Ser Val Ala Gly Val Phe Ser
55 70 75 80

Val Leu Gln His Ala Ser Cys Pro Glu Asn Ile Val Phe His Phe Ile
85 90 95

Ala Thr His Arg Arg Ser Ala Asp Leu Arg Arg Ile Ile Ser Ser Thr
100 105 110

Ile Pro Tyr Leu Thr Tyr His Ile Tyr His Phe Asp Pro Asn Leu Val
115 120 125

14-03 WO.sequence Listing.txt

Arg Ser Lys Ile Ser Ser Ser Ile Arg Arg Ala Leu Asp Gln Pro Leu
130 135 140

Asn Tyr Ala Arg Ile Tyr Leu Ala Asp Leu Leu Pro Ile Ala Val Arg
145 150 155 160

Arg Val Ile Tyr Phe Asp Ser Asp Leu Val Val Val Asp Asp Val Ala
165 170 175

Lys Leu Trp Arg Ile Asp Leu Arg Arg His Val Val Gly Ala Pro Glu
180 185 190

Tyr Cys His Ala Asn Phe Thr Asn Tyr Phe Thr Ser Arg Phe Trp Ser
195 200 205

Ser Gln Gly Tyr Lys Ser Ala Leu Lys Asp Arg Lys Pro Cys Tyr Phe
210 215 220

Asn Thr Gly Val Met Val Ile Asp Leu Gly Lys Trp Arg Glu Arg Arg
225 230 235 240

Val Thr Val Lys Leu Glu Thr Trp Met Arg Ile Gln Lys Arg His Arg
245 250 255

Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly
260 265 270

Asp Val Glu Pro Val Glu His Arg Trp Asn Gln His Gly Leu Gly Gly
275 280 285

Asp Asn Leu Glu Gly Leu Cys Arg Asn Leu His Pro Gly Pro Val Ser
290 295 300

Leu Leu His Trp Ser Gly Lys Gly Lys Pro Trp Leu Arg Leu Asp Ser
305 310 315 320

Arg Arg Pro Cys Pro Leu Asp Ser Leu Trp Ala Pro Tyr Asp Leu Phe
325 330 335

Arg Tyr Ser Pro Leu Ile Ser Asp Ser
340 345

<210> 35
<211> 1056
<212> DNA
<213> *Arabidopsis thaliana*

14-03 WO.sequence listing.txt

<400> 35	atgtcccaac atcttcttct tctcattctc ctctcgctac ttcttcttca taaaccatt	60
tccgccacta caattattca aaaattcaaa gaagccccac agttttacaa ttctgcagat	120	
tgccccttaa tcgatgactc cgagtccgac gatgacgtgg tcgccaaacc aatcttctgc	180	
tcacgtcgag ctgtccacgt ggcgatgaca ctcgacgccc cctacattcg tggctcagtc	240	
gccgctgttc tctccgtcct ccaacactct tcttgcctg aaaacattgt tttccacttc	300	
gtcgccctcg ctcccgccga cgcttcttcc ttacgagcca ccataccctc ctcttccct	360	
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ctgtgttagag atctccatcc tggtcgggtg agtctgttc attggagtgg gaaaggtaag	960	
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<210> 36

<211> 351

<212> PRT

<213> *Arabidopsis thaliana*

<400> 36

Met Ser Gln His Leu Leu Leu Leu Ile Leu Leu Ser Leu Leu Leu			
1	5	10	15

His Lys Pro Ile Ser Ala Thr Thr Ile Ile Gln Lys Phe Lys Glu Ala		
20	25	30

Pro Gln Phe Tyr Asn Ser Ala Asp Cys Pro Leu Ile Asp Asp Ser Glu		
35	40	45

Ser Asp Asp Asp Val Val Ala Lys Pro Ile Phe Cys Ser Arg Arg Ala		
50	55	60

Val His Val Ala Met Thr Leu Asp Ala Ala Tyr Ile Arg Gly Ser Val			
65	70	75	80

14-03 WO.sequence listing.txt

Ala Ala Val Leu Ser Val Leu Gln His Ser Ser Cys Pro Glu Asn Ile
85 90 95

Val Phe His Phe Val Ala Ser Ala Ser Ala Asp Ala Ser Ser Leu Arg
100 105 110

Ala Thr Ile Ser Ser Ser Phe Pro Tyr Leu Asp Phe Thr Val Tyr Val
115 120 125

Phe Asn Val Ser Ser Val Ser Arg Leu Ile Ser Ser Ile Arg Ser
130 135 140

Ala Leu Asp Cys Pro Leu Asn Tyr Ala Arg Ser Tyr Leu Ala Asp Leu
145 150 155 160

Leu Pro Pro Cys Val Arg Arg Val Val Tyr Leu Asp Ser Asp Leu Ile
165 170 175

Leu Val Asp Asp Ile Ala Lys Leu Ala Ala Thr Asp Leu Gly Arg Asp
180 185 190

Ser Val Leu Ala Ala Pro Glu Tyr Cys Asn Ala Asn Phe Thr Ser Tyr
195 200 205

Phe Thr Ser Thr Phe Trp Ser Asn Pro Thr Leu Ser Leu Thr Phe Ala
210 215 220

Asp Arg Lys Ala Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu
225 230 235 240

Ser Arg Trp Arg Glu Gly Ala Tyr Thr Ser Arg Ile Glu Glu Trp Met
245 250 255

Ala Met Gln Lys Arg Met Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro
260 265 270

Phe Leu Leu Val Phe Ala Gly Leu Ile Lys Pro Val Asn His Arg Trp
275 280 285

Asn Gln His Gly Leu Gly Gly Asp Asn Phe Arg Gly Leu Cys Arg Asp
290 295 300

Leu His Pro Gly Pro Val Ser Leu Leu His Trp Ser Gly Lys Gly Lys
305 310 315 320

Pro Trp Ala Arg Leu Asp Ala Gly Arg Pro Cys Pro Leu Asp Ala Leu

14-03 WO.sequence Listing.txt
325 330 335Trp Ala Pro Tyr Asp Leu Leu Gln Thr Pro Phe Ala Leu Asp Ser
340 345 350

<210> 37
<211> 1182
<212> DNA
<213> *Arabidopsis thaliana*

<400> 37
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aataatgggt ttagtaaact tggtcgttt atggaagctc cggagtatag aaacggcaag 180
gagtgtgtat cttcatcagt gaacagagag aacttcgtgt cgtcttcttc tagttctaat 240
gatccttcgc ttgttcacat cgctatgact ttggactcag agtatctccg tggatcaatc 300
gcagccgttc attctgttct tcgccacgcg tcttgcctt agaacgtctt cttccatttc 360
atcgctgctg agtttgcactc tgcgagtcct cgtgttctga gtcaactcgt gaggtcgact 420
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tcttcttcga ttagacttagc tttggagaat ccgttgaact atgctcgaa ctatctcgaa 540
gatattcttgcgtt atcgaagtgt tgaacgagtc atttatcttgcgtt actcgatgt tataactgtg 600
gatgatataca caaagctttg gaacacgggtt ttgaccgggtt cacgagtcat cggagctccg 660
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ccatatgatt tggatggaaat tggatggaaat agagctaaatg atcagtctct gcttgggtttt 1140
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<210> 38
<211> 393
<212> PRT
<213> *Arabidopsis thaliana*

<400> 38

Met Ser Ser Arg Phe Ser Leu Thr Val Val Cys Leu Ile Ala Leu Leu
1 5 10 15

14-03 WO.sequence listing.txt

Pro Phe Val Val Gly Ile Arg Leu Ile Pro Ala Arg Ile Thr Ser Val
20 25 30

Gly Asp Gly Gly Gly Gly Asn Asn Gly Phe Ser Lys Leu Gly
35 40 45

Pro Phe Met Glu Ala Pro Glu Tyr Arg Asn Gly Lys Glu Cys Val Ser
50 55 60

Ser Ser Val Asn Arg Glu Asn Phe Val Ser Ser Ser Ser Ser Asn
65 70 75 80

Asp Pro Ser Leu Val His Ile Ala Met Thr Leu Asp Ser Glu Tyr Leu
85 90 95

Arg Gly Ser Ile Ala Ala Val His Ser Val Leu Arg His Ala Ser Cys
100 105 110

Pro Glu Asn Val Phe Phe His Phe Ile Ala Ala Glu Phe Asp Ser Ala
115 120 125

Ser Pro Arg Val Leu Ser Gln Leu Val Arg Ser Thr Phe Pro Ser Leu
130 135 140

Asn Phe Lys Val Tyr Ile Phe Arg Glu Asp Thr Val Ile Asn Leu Ile
145 150 155 160

Ser Ser Ser Ile Arg Leu Ala Leu Glu Asn Pro Leu Asn Tyr Ala Arg
165 170 175

Asn Tyr Leu Gly Asp Ile Leu Asp Arg Ser Val Glu Arg Val Ile Tyr
180 185 190

Leu Asp Ser Asp Val Ile Thr Val Asp Asp Ile Thr Lys Leu Trp Asn
195 200 205

Thr Val Leu Thr Gly Ser Arg Val Ile Gly Ala Pro Glu Tyr Cys His
210 215 220

Ala Asn Phe Thr Gln Tyr Phe Thr Ser Gly Phe Trp Ser Asp Pro Ala
225 230 235 240

Leu Pro Gly Leu Ile Ser Gly Gln Lys Pro Cys Tyr Phe Asn Thr Gly
245 250 255

Val Met Val Met Asp Leu Val Arg Trp Arg Glu Gly Asn Tyr Arg Glu

14-03 wO.sequence listing.txt
260 265 270

Lys Leu Glu Gln Trp Met Gln Leu Gln Lys Lys Met Arg Ile Tyr Asp
275 280 285

Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Val Glu
290 295 300

Ala Ile Asp His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Ile
305 310 315 320

Arg Gly Ser Cys Arg Ser Leu His Pro Gly Pro Val Ser Leu Leu His
325 330 335

Trp Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Glu Lys Arg Pro
340 345 350

Cys Pro Leu Asp His Leu Trp Glu Pro Tyr Asp Leu Tyr Lys His Lys
355 360 365

Ile Glu Arg Ala Lys Asp Gln Ser Leu Leu Gly Phe Ala Ser Leu Ser
370 375 380

Glu Leu Thr Asp Asp Ser Ser Phe Leu
385 390

<210> 39
<211> 1173
<212> DNA
<213> *Arabidopsis thaliana*

<400> 39
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accgtcgaa atggcttga tctgggtcg ttcgtggaag ctccggagta cagaaacggc 180
aaggagtgcg tgtctcaatc gttgaacaga gaaaacttcg tgtcgtcttgcgacgcttcg 240
ttagttcatg tagctatgac gcttgactcg gagtacttac gtggctcaat cgacgcccgt 300
cattcaatgc tccgccacgc gtcgtgtcca gaaaacgtct tcttccatct catcgctgca 360
gagtttggacc cggcgagtcc acgcgttctg agtcaactcg tccgatctac tttccgtcg 420
ctaaacctca aagtctacat tttccggaa gatacggtgatcaaccttat ctcttcttca 480
atcagacaag cttagagaa tccattgaac tatgctcgaa actacctcg agatattctt 540
gatccatgctg tagacagagt cattaccta gactcggaca tcattcgtcgatgacata 600
acaaagctt ggaacacgag tttgacaggg tcaagaatca tcggagctcc ggagtattgt 660

14-03 WO.sequence Listing.txt

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aagagaatct acgatttggg ttcttgcct ccgttcttc ttgtcttcgc agggAACgtt	900
gaagcaattt atcataggtt gaaccaacat gtttaggag gagacaatgt acgaggaagt	960
tgttaggtctt tgcataaagg accagttagt ttgttgcatt ggagtggtaa aggttaagcca	1020
tgggtgagac ttgatgagaa gagaccgtt ccgttggatc atttatggg accgtatgtat	1080
ttatatgagc ataagattga aagagctaaa gatcagtctt tgccgggtt ctcttcttg	1140
tctgagttaa cagaagattc aagcttttc tga	1173

<210> 40
<211> 390

<212> PRT

<213> *Arabidopsis thaliana*

<400> 40

Met Arg Leu Arg Phe Pro Met Lys Ser Ala Val Leu Ala Phe Ala Ile
1 5 10 15

Phe Leu Val Phe Ile Pro Leu Phe Ser Val Gly Ile Arg Met Ile Pro
20 25 30

Gly Arg Leu Thr Ala Val Ser Ala Thr Val Gly Asn Gly Phe Asp Leu
35 40 45

Gly Ser Phe Val Glu Ala Pro Glu Tyr Arg Asn Gly Lys Glu Cys Val
50 55 60

Ser Gln Ser Leu Asn Arg Glu Asn Phe Val Ser Ser Cys Asp Ala Ser
65 70 75 80

Leu Val His Val Ala Met Thr Leu Asp Ser Glu Tyr Leu Arg Gly Ser
85 90 95

Ile Ala Ala Val His Ser Met Leu Arg His Ala Ser Cys Pro Glu Asn
100 105 110

Val Phe Phe His Leu Ile Ala Ala Glu Phe Asp Pro Ala Ser Pro Arg
115 120 125

Val Leu Ser Gln Leu Val Arg Ser Thr Phe Pro Ser Leu Asn Phe Lys
130 135 140

Val Tyr Ile Phe Arg Glu Asp Thr Val Ile Asn Leu Ile Ser Ser Ser
Page 63

145 150 155 160
Ile Arg Gln Ala Leu Glu Asn Pro Leu Asn Tyr Ala Arg Asn Tyr Leu
165 170 175
Gly Asp Ile Leu Asp Pro Cys Val Asp Arg Val Ile Tyr Leu Asp Ser
180 185 190
Asp Ile Ile Val Val Asp Asp Ile Thr Lys Leu Trp Asn Thr Ser Leu
195 200 205
Thr Gly Ser Arg Ile Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe
210 215 220
Thr Lys Tyr Phe Thr Ser Gly Phe Trp Ser Asp Pro Ala Leu Pro Gly
225 230 235 240
Phe Phe Ser Gly Arg Lys Pro Cys Tyr Phe Asn Thr Gly Val Met Val
245 250 255
Met Asp Leu Val Arg Trp Arg Glu Gly Asn Tyr Arg Glu Lys Leu Glu
260 265 270
Thr Trp Met Gln Ile Gln Lys Lys Arg Ile Tyr Asp Leu Gly Ser
275 280 285
Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Val Glu Ala Ile Asp
290 295 300
His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser
305 310 315 320
Cys Arg Ser Leu His Lys Gly Pro Val Ser Leu Leu His Trp Ser Gly
325 330 335
Lys Gly Lys Pro Trp Val Arg Leu Asp Glu Lys Arg Pro Cys Pro Leu
340 345 350
Asp His Leu Trp Glu Pro Tyr Asp Leu Tyr Glu His Lys Ile Glu Arg
355 360 365
Ala Lys Asp Gln Ser Leu Phe Gly Phe Ser Ser Leu Ser Glu Leu Thr
370 375 380
Glu Asp Ser Ser Phe Phe
385 390

14-03 WO.sequence listing.txt

<210> 41
 <211> 1056
 <212> DNA
 <213> *Arabidopsis thaliana*

<400> 41
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 ccaactcttc ctgtttcag agaagccccg gctttcgaa acggatca atgcgggact 180
 cgtgaggctg atcagattca tatcgccatg actctcgaca caaactacct ccgtggcaca 240
 atggctgccg ttttgtctct cttcaacat tccacttgcc ctgaaaacct ctctttcat 300
 ttcctgtccc ttccctcattt cgaaaacgac ctttcacca gcatcaaatc aaccttcct 360
 tacctaaact tcaagattt tcaagtttgc ccaaaccctcg tcccgagcaa gatatcgaaa 420
 tccatcaggc aagcccttga tcagcctctt aactacgcaa gaatctacct cgcggatatc 480
 atccctagca gcgttgcacag gatcatctac ttagactcag acctcggtgt ggttagacgac 540
 atagagaagc tgtggcatgt ggagatggaa ggtaaagtgg tggctgctcc cgagtactgc 600
 cacgcaaaact tcacccatta tttcacaaga actttctggc cagacccggc attggtaaaa 660
 gttcttgaag gaaaacgtcc gtgttatttc aacacagggg ttagtgggtgt ggatgtaaac 720
 aaatggagga aaggaatgta tacacagaag ttagaagagt ggatgacaat tcagaagcag 780
 aagaggatat accatttggg atcattacct ccgtttctgc ttagtattcgc cggatata 840
 aaagcggta atcataggtg gaaccagcat ggtcttaggag gtgataattt cgaaggaaga 900
 tgtagaacgt tgcattccggg accgataagt cttcttact ggagtggaaa agggaaagcca 960
 tggtaagac tagattcaag gaagccttgt atcggtgatc atctatggc accgtatgtat 1020
 ctgtaccgtt catcaagaca ttcatcattaa gagtag 1056

<210> 42
 <211> 351
 <212> PRT
 <213> *Arabidopsis thaliana*

<400> 42

Met Ala Ser Arg Ser Leu Ser Tyr Thr Gln Leu Leu Gly Leu Leu Ser
 1 5 10 15

Phe Ile Leu Leu Leu Val Thr Thr Thr Met Ala Val Arg Val Gly
 20 25 30

Val Ile Leu His Lys Pro Ser Ala Pro Thr Leu Pro Val Phe Arg Glu
 35 40 45

Ala Pro Ala Phe Arg Asn Gly Asp Gln Cys Gly Thr Arg Glu Ala Asp
 Page 65

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50

55

60

Gln Ile His Ile Ala Met Thr Leu Asp Thr Asn Tyr Leu Arg Gly Thr
65 70 75 80

Met Ala Ala Val Leu Ser Leu Leu Gln His Ser Thr Cys Pro Glu Asn
85 90 95

Leu Ser Phe His Phe Leu Ser Leu Pro His Phe Glu Asn Asp Leu Phe
100 105 110

Thr Ser Ile Lys Ser Thr Phe Pro Tyr Leu Asn Phe Lys Ile Tyr Gln
115 120 125

Phe Asp Pro Asn Leu Val Arg Ser Lys Ile Ser Lys Ser Ile Arg Gln
130 135 140

Ala Leu Asp Gln Pro Leu Asn Tyr Ala Arg Ile Tyr Leu Ala Asp Ile
145 150 155 160

Ile Pro Ser Ser Val Asp Arg Ile Ile Tyr Leu Asp Ser Asp Leu Val
165 170 175

Val Val Asp Asp Ile Glu Lys Leu Trp His Val Glu Met Glu Gly Lys
180 185 190

Val Val Ala Ala Pro Glu Tyr Cys His Ala Asn Phe Thr His Tyr Phe
195 200 205

Thr Arg Thr Phe Trp Ser Asp Pro Val Leu Val Lys Val Leu Glu Gly
210 215 220

Lys Arg Pro Cys Tyr Phe Asn Thr Gly Val Met Val Val Asp Val Asn
225 230 235 240

Lys Trp Arg Lys Gly Met Tyr Thr Gln Lys Val Glu Glu Trp Met Thr
245 250 255

Ile Gln Lys Gln Lys Arg Ile Tyr His Leu Gly Ser Leu Pro Pro Phe
260 265 270

Leu Leu Ile Phe Ala Gly Asp Ile Lys Ala Val Asn His Arg Trp Asn
275 280 285

Gln His Gly Leu Gly Gly Asp Asn Phe Glu Gly Arg Cys Arg Thr Leu
290 295 300

14-03 WO.sequence listing.txt

His Pro Gly Pro Ile Ser Leu Leu His Trp Ser Gly Lys Gly Lys Pro
 305 310 315 320

Trp Leu Arg Leu Asp Ser Arg Lys Pro Cys Ile Val Asp His Leu Trp
 325 330 335

Ala Pro Tyr Asp Leu Tyr Arg Ser Ser Arg His Ser Leu Glu Glu
 340 345 350

<210> 43

<211> 1098

<212> DNA

<213> *Arabidopsis thaliana*

<400> 43

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 gatttaatgg aagctccagc atatcaaaac ggtcttgatt gctctgtttt agccaaaaac 180
 agactcttgt tagcttgtga tccatcagct gttcatatag ctatgactct agatccagct 240
 tacttgcgtg gcacggtatac tgcagttacat tccatcctca aacacacttc ttgcctgaa 300
 aacatcttct tccacttcat tgcttcgggt acaagtcagg gttccctcgc caagacccta 360
 tcctctgttt ttcccttctt gagttcaaa gtctataccct ttgaagaaac cacggtcaag 420
 aatctaattct cttcttctat aagacaagct cttgatagtc ctttgaatttta cgcaagaagc 480
 tacttatccg agattcttc ttcgtgtgtt agtcgagtga tttatctcga ttcggatgtg 540
 attgtggtcg atgatattca gaaactatgg aagatttctt tatccgggtc aagaacaatc 600
 ggtgcaccag agtattgcca cgcaaatttc accaaatact tcacagatag tttctgggtcc 660
 gatcaaaaac tctcgagtgt cttcgattcc aagactccctt gttatccaa cacaggatgt 720
 atggttatcg atttagagcg atggagagaa ggagattaca cgagaaagat cgaaaactgg 780
 atgaagattc agaaagaaga taagagaatc tacgaattgg gttctttacc accgtttctt 840
 ctagtgtttg gtggtgatat tgaagctatt gatcatcaat ggaaccaaca cggtctcggt 900
 ggagacaaca ttgtgagtag ttgttagatct ttgcattcctg gtccggtag tttgatacat 960
 tggagtggtta aaggaaagcc atgggttagg cttgatgatg gtaaggcttg tccaattgat 1020
 tatctttggg ctccttatga tcttcacaag tcacagaggc agtatctca atacaatcaa 1080
 gagttagaaa ttctttga 1098

<210> 44

<211> 365

<212> PRT

<213> *Arabidopsis thaliana*

<400> 44

14-03 WO.sequence listing.txt

Met Met Ser Gly Ser Arg Leu Ala Ser Arg Leu Ile Ile Ile Phe Ser
1 5 10 15

Ile Ile Ser Thr Ser Phe Phe Thr Val Glu Ser Ile Arg Leu Phe Pro
20 25 30

Asp Ser Phe Asp Asp Ala Ser Ser Asp Leu Met Glu Ala Pro Ala Tyr
35 40 45

Gln Asn Gly Leu Asp Cys Ser Val Leu Ala Lys Asn Arg Leu Leu Leu
50 55 60

Ala Cys Asp Pro Ser Ala Val His Ile Ala Met Thr Leu Asp Pro Ala
65 70 75 80

Tyr Leu Arg Gly Thr Val Ser Ala Val His Ser Ile Leu Lys His Thr
85 90 95

Ser Cys Pro Glu Asn Ile Phe Phe His Phe Ile Ala Ser Gly Thr Ser
100 105 110

Gln Gly Ser Leu Ala Lys Thr Leu Ser Ser Val Phe Pro Ser Leu Ser
115 120 125

Phe Lys Val Tyr Thr Phe Glu Glu Thr Thr Val Lys Asn Leu Ile Ser
130 135 140

Ser Ser Ile Arg Gln Ala Leu Asp Ser Pro Leu Asn Tyr Ala Arg Ser
145 150 155 160

Tyr Leu Ser Glu Ile Leu Ser Ser Cys Val Ser Arg Val Ile Tyr Leu
165 170 175

Asp Ser Asp Val Ile Val Val Asp Asp Ile Gln Lys Leu Trp Lys Ile
180 185 190

Ser Leu Ser Gly Ser Arg Thr Ile Gly Ala Pro Glu Tyr Cys His Ala
195 200 205

Asn Phe Thr Lys Tyr Phe Thr Asp Ser Phe Trp Ser Asp Gln Lys Leu
210 215 220

Ser Ser Val Phe Asp Ser Lys Thr Pro Cys Tyr Phe Asn Thr Gly Val
225 230 235 240

Met Val Ile Asp Leu Glu Arg Trp Arg Glu Gly Asp Tyr Thr Arg Lys
245 250 255

14-03 WO.sequence listing.txt

Ile Glu Asn Trp Met Lys Ile Gln Lys Glu Asp Lys Arg Ile Tyr Glu
260 265 270

Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Gly Gly Asp Ile Glu
275 280 285

Ala Ile Asp His Gln Trp Asn Gln His Gly Leu Gly Gly Asp Asn Ile
290 295 300

Val Ser Ser Cys Arg Ser Leu His Pro Gly Pro Val Ser Leu Ile His
305 310 315 320

Trp Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Asp Gly Lys Pro
325 330 335

Cys Pro Ile Asp Tyr Leu Trp Ala Pro Tyr Asp Leu His Lys Ser Gln
340 345 350

Arg Gln Tyr Leu Gln Tyr Asn Gln Glu Leu Glu Ile Leu
355 360 365

<210> 45

<211> 1026

<212> DNA

<213> *Arabidopsis thaliana*

<400> 45

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ggcggcgaga	gattcaaaga	agctccaaag	ttcttcaact	ccccggagtg	tctaaccatc	120
gaaaacgatg	aagatttcgt	ttgttcagac	aaagccatcc	acgtggcaat	gaccttagac	180
acagcttacc	tccgtggctc	aatggccgtg	attctctccg	tcctccaaca	ctcttcttgt	240
cctcaaaaaca	ttgttttcca	cttcgtcaact	tcaaaacaaa	gccaccgact	ccaaaactac	300
gtcgttgctt	ctttcccta	cttgaaattc	cgaatttacc	cttacgacgt	agccgccatc	360
tccggcctca	tctcaacctc	catccgctcc	gcgctagact	ctccgctaaa	ctacgcaaga	420
aactacctcg	ccgacattct	tcccacgtgc	ctctcacgtg	tcgtataacct	agactcagat	480
ctcatactcg	tcgatgacat	ctccaagctc	ttctccactc	acatccctac	cgacgtcggt	540
ttagccgcgc	ctgagttactg	caacgcaaac	ttcacgactt	actttactcc	gacgttttg	600
tcaaaccctt	ctctctccat	cacactatcc	ctcaaccgcc	gtgctacacc	gtgttacttc	660
aacacccggag	tgatggtcat	cgagttaaag	aatggcgag	aaggagatta	cacgaggaag	720
atcatagagt	ggatggagtt	acaaaaacgg	ataagaatct	acgagttagg	ctctttacca	780
ccgtttttac	ttgtcttcgc	cgaaacata	gctccggtag	atcaccggtg	gaacccaacac	840

14-03 WO.sequence listing.txt

ggtttaggag gagataattt tagaggactg tgtcgagatt tgcattcagg tccagtgagt 900
 ttgttgcatt ggagtggaa aggaaagcca tggtaaggt tagatgatgg tcgacccgc 960
 ccgcttgatg cacttgggt tccatatgtat ttgttagagt cacggtcga ccttatcgag 1020
 agttaa 1026

<210> 46
 <211> 341
 <212> PRT
 <213> *Arabidopsis thaliana*

<400> 46

Met His Ser Lys Phe Ile Leu Tyr Leu Ser Ile Leu Ala Val Phe Thr
 1 5 10 15

Val Ser Phe Ala Gly Gly Glu Arg Phe Lys Glu Ala Pro Lys Phe Phe
 20 25 30

Asn Ser Pro Glu Cys Leu Thr Ile Glu Asn Asp Glu Asp Phe Val Cys
 35 40 45

Ser Asp Lys Ala Ile His Val Ala Met Thr Leu Asp Thr Ala Tyr Leu
 50 55 60

Arg Gly Ser Met Ala Val Ile Leu Ser Val Leu Gln His Ser Ser Cys
 65 70 75 80

Pro Gln Asn Ile Val Phe His Phe Val Thr Ser Lys Gln Ser His Arg
 85 90 95

Leu Gln Asn Tyr Val Val Ala Ser Phe Pro Tyr Leu Lys Phe Arg Ile
 100 105 110

Tyr Pro Tyr Asp Val Ala Ala Ile Ser Gly Leu Ile Ser Thr Ser Ile
 115 120 125

Arg Ser Ala Leu Asp Ser Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala
 130 135 140

Asp Ile Leu Pro Thr Cys Leu Ser Arg Val Val Tyr Leu Asp Ser Asp
 145 150 155 160

Leu Ile Leu Val Asp Asp Ile Ser Lys Leu Phe Ser Thr His Ile Pro
 165 170 175

Thr Asp Val Val Leu Ala Ala Pro Glu Tyr Cys Asn Ala Asn Phe Thr
 180 185 190

14-03 WO.sequence Listing.txt

Thr Tyr Phe Thr Pro Thr Phe Trp Ser Asn Pro Ser Leu Ser Ile Thr
 195 200 205

Leu Ser Leu Asn Arg Arg Ala Thr Pro Cys Tyr Phe Asn Thr Gly Val
 210 215 220

Met Val Ile Glu Leu Lys Lys Trp Arg Glu Gly Asp Tyr Thr Arg Lys
 225 230 235 240

Ile Ile Glu Trp Met Glu Leu Gln Lys Arg Ile Arg Ile Tyr Glu Leu
 245 250 255

Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Ile Ala Pro
 260 265 270

Val Asp His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Phe Arg
 275 280 285

Gly Leu Cys Arg Asp Leu His Pro Gly Pro Val Ser Leu Leu His Trp
 290 295 300

Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Asp Gly Arg Pro Cys
 305 310 315 320

Pro Leu Asp Ala Leu Trp Val Pro Tyr Asp Leu Leu Glu Ser Arg Phe
 325 330 335

Asp Leu Ile Glu Ser
 340

<210> 47
 <211> 1086

<212> DNA

<213> *Arabidopsis thaliana*

<400> 47

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tacccctcctc	cgatccaccc	ccgcatagat	tcccttcag	aaaagctcct		180
gttttccgca	atgcccggca	ttgcggcc	gcagatatcg	attccggcgt	ctgttaaccct	240
tccttggtcc	acgtcgcgat	tactctcgat	ttcgagtacc	tgcgtggctc	aatcgccgccc	300
gttcattcga	ttctcaagca	ctcgctgtgt	cccgagagcg	tcttcttcca	tttcctcgtc	360
tccgagactg	acctagaatc	cttgattcggt	tcgacttttc	ccgaattgaa	attaaaggtt	420
tactacttcg	atccggagat	tgtacggacg	ctgatctcaa	cctccgtgag	acaagcgctc	480

14-03 WO.sequence listing.txt

gagcagccgt tgaattacgc tagaaattac ctagctgacc ttctcgagcc ttgcgtgcgt	540
cgcgtatct acctagattc cgatctaattc gtcgtcgacg acatcgaaa gctctggatg	600
acgaaactgg gatcgaaaac gatcggagct cccgagtact gtcacgcgaa cttcacaaag	660
tatttcacac cggcgttctg gtccgacgag aggttctccg gagcttctc cgggaggaaa	720
ccgtgctact tcaacacggg agtgatggtg atggatctag agagatggag ggcgttaggg	780
tacacggagg tgatagagaa atggatggag attcagaaga gtgataggat ttacgagctg	840
ggatcattgc cgccgttctt gttgggttgc gcccggagaag tagctccgat agagcatcg	900
tggaaccagc atgggcttgg tggagataac gtgagaggaa gctgtagaga tttacatccc	960
ggtccggta gcttgcgttca ttggccggt agtggtaaac cgtggttcg gttagattcg	1020
agacggcctt gtccacttga tactcttgg gcaccttatg atttgtatgg acactactct	1080
cgctga	1086

<210> 48

<211> 361

<212> PRT

<213> *Arabidopsis thaliana*

<400> 48

Met Leu Trp Ile Met Arg Phe Ser Gly Leu Phe Ser Ala Ala Leu Val			
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10	15		

Ile Ile Val Leu Ser Pro Ser Leu Gln Ser Phe Pro Pro Ala Glu Ala			
20	25	30	
30			

Ile Arg Ser Ser His Leu Asp Ala Tyr Leu Arg Phe Pro Ser Ser Asp			
35	40	45	
45			

Pro Pro Pro His Arg Phe Ser Phe Arg Lys Ala Pro Val Phe Arg Asn			
50	55	60	
60			

Ala Ala Asp Cys Ala Ala Asp Ile Asp Ser Gly Val Cys Asn Pro			
65	70	75	80
75	80		

Ser Leu Val His Val Ala Ile Thr Leu Asp Phe Glu Tyr Leu Arg Gly			
85	90	95	
95			

Ser Ile Ala Ala Val His Ser Ile Leu Lys His Ser Ser Cys Pro Glu			
100	105	110	
110			

Ser Val Phe Phe His Phe Leu Val Ser Glu Thr Asp Leu Glu Ser Leu			
115	120	125	
125			

14-03 WO.sequence listing.txt

Ile Arg Ser Thr Phe Pro Glu Leu Lys Leu Lys Val Tyr Tyr Phe Asp
130 135 140

Pro Glu Ile Val Arg Thr Leu Ile Ser Thr Ser Val Arg Gln Ala Leu
145 150 155 160

Glu Gln Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala Asp Leu Leu Glu
165 170 175

Pro Cys Val Arg Arg Val Ile Tyr Leu Asp Ser Asp Leu Ile Val Val
180 185 190

Asp Asp Ile Ala Lys Leu Trp Met Thr Lys Leu Gly Ser Lys Thr Ile
195 200 205

Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe Thr Pro
210 215 220

Ala Phe Trp Ser Asp Glu Arg Phe Ser Gly Ala Phe Ser Gly Arg Lys
225 230 235 240

Pro Cys Tyr Phe Asn Thr Gly Val Met Val Met Asp Leu Glu Arg Trp
245 250 255

Arg Arg Val Gly Tyr Thr Glu Val Ile Glu Lys Trp Met Glu Ile Gln
260 265 270

Lys Ser Asp Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu Leu
275 280 285

Val Phe Ala Gly Glu Val Ala Pro Ile Glu His Arg Trp Asn Gln His
290 295 300

Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu His Pro
305 310 315 320

Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro Trp Phe
325 330 335

Arg Leu Asp Ser Arg Arg Pro Cys Pro Leu Asp Thr Leu Trp Ala Pro
340 345 350

Tyr Asp Leu Tyr Gly His Tyr Ser Arg
355 360

<210> 49
<211> 1041
<212> DNA

14-03 WO.sequence listing.txt

<213> *Arabidopsis thaliana*

<400> 49	atgccttgga taacgagatt tgctggatta ttctccgccc cgatggcagt gatcgtgtta	60
	tctccgtcgc ttcagtcatt tcctccggcg gcggcaatcc gttcttctcc atcaccgatc	120
	ttcagaaaag ctccagcggt gttcaacaac ggcgacgaat gtctctcc tc cggcggcg	180
	tgcaatccgt cgttggtcca cgtggcgatc acgttagacg tagagtacct gcgtggctca	240
	atcgcagccg ttaactcgat cttcagcac tcggtgtgtc cagagacgt cttcttccac	300
	ttcatcgccg tctccgagga aacaaacctg ttggagtgc tggtgagatc ggttttccg	360
	agactgaaat tcaatattta cgattttgcc cctgagacag ttcgtggttt gatttcttct	420
	tccgtgagac aagctctcgat gcagcctctg aactacgcta gaagctactt agcggatctg	480
	ctggagcctt gtgttaaccg tgtcatatac ttggattcgg atcttgcgt cgtcgatgac	540
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	aaatggagaa gaggtggta cacgaaacgt atcgagaaat ggatggagat tcagagaaga	780
	gagaggattt acgaacttagg ctcgcttcca ccgtttcttc tagtttctc cggcacgtg	840
	gctcccatct ctcaccggtg gaaccagcat ggacttggtg gtgacaatgt tagaggtac	900
	tgcgtgatt tgcattctgg tcctgtgagt ttgctgcatt ggtctggtag tggcaagccc	960
	tggataagac tcgattccaa acggccttgt cccttagacg cattatggac gccttacgac	1020
	ttgtatcgac attcgattt a	1041

<210> 50

<211> 346

<212> PRT

<213> *Arabidopsis thaliana*

<400> 50

Met	Leu	Trp	Ile	Thr	Arg	Phe	Ala	Gly	Leu	Phe	Ser	Ala	Ala	Met	Ala
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Val	Ile	Val	Leu	Ser	Pro	Ser	Leu	Gln	Ser	Phe	Pro	Pro	Ala	Ala	Ala
								25					30		

Ile	Arg	Ser	Ser	Pro	Ser	Pro	Ile	Phe	Arg	Lys	Ala	Pro	Ala	Val	Phe
35							40					45			

Asn	Asn	Gly	Asp	Glu	Cys	Leu	Ser	Ser	Gly	Gly	Val	Cys	Asn	Pro	Ser
50							55				60				

14-03 WO.sequence listing.txt

Leu Val His Val Ala Ile Thr Leu Asp Val Glu Tyr Leu Arg Gly Ser
65 70 75 80

Ile Ala Ala Val Asn Ser Ile Leu Gln His Ser Val Cys Pro Glu Ser
85 90 95

Val Phe Phe His Phe Ile Ala Val Ser Glu Glu Thr Asn Leu Leu Glu
100 105 110

Ser Leu Val Arg Ser Val Phe Pro Arg Leu Lys Phe Asn Ile Tyr Asp
115 120 125

Phe Ala Pro Glu Thr Val Arg Gly Leu Ile Ser Ser Ser Val Arg Gln
130 135 140

Ala Leu Glu Gln Pro Leu Asn Tyr Ala Arg Ser Tyr Leu Ala Asp Leu
145 150 155 160

Leu Glu Pro Cys Val Asn Arg Val Ile Tyr Leu Asp Ser Asp Leu Val
165 170 175

Val Val Asp Asp Ile Ala Lys Leu Trp Lys Thr Ser Leu Gly Ser Arg
180 185 190

Ile Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe
195 200 205

Thr Gly Gly Phe Trp Ser Glu Glu Arg Phe Ser Gly Thr Phe Arg Gly
210 215 220

Arg Lys Pro Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu Lys
225 230 235 240

Lys Trp Arg Arg Gly Gly Tyr Thr Lys Arg Ile Glu Lys Trp Met Glu
245 250 255

Ile Gln Arg Arg Glu Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe
260 265 270

Leu Leu Val Phe Ser Gly His Val Ala Pro Ile Ser His Arg Trp Asn
275 280 285

Gln His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu
290 295 300

His Pro Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro
305 310 315 320

14-03 w0.sequence listing.txt

Trp Ile Arg Leu Asp Ser Lys Arg Pro Cys Pro Leu Asp Ala Leu Trp
325 330 335

Thr Pro Tyr Asp Leu Tyr Arg His Ser His
340 345